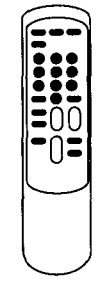
SERVICE MANUAL

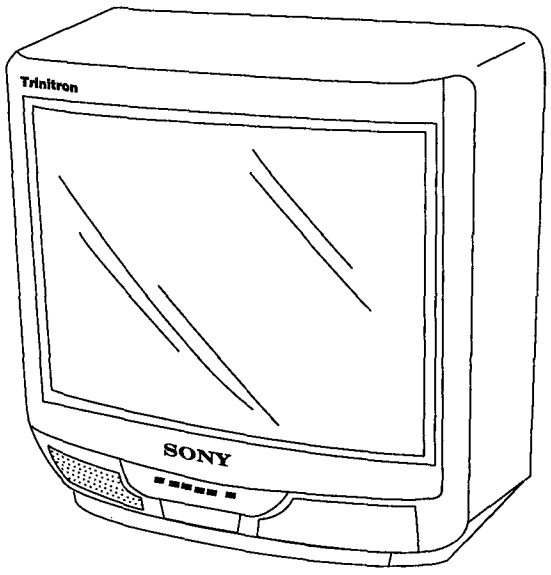
BA - 3 CHASSIS

MODEL	COMMANDER	DEST.	CHASSIS NO.
KV-13M20	RM-Y116	CND	SCC-J93A-A
KV-13M20	RM-Y116	US	SCC-J84D-A
KV-13M30	RM-Y116	US	SCC-J84A-A
KV-13M31	RM-Y116	US	SCC-J84E-A

MODEL	COMMANDER	DEST.	CHASSIS NO.
KV-14R20	RM-Y116	E	SCC-J94A-A
KV-14RD1	RM-Y116	E	SCC-J95A-A
KV-14PM1	RM-Y116	E	SCC-J95B-A



RM-Y116



KV-13M20

TRINITRON® COLOR TV

SONY®

MICROFILM

※ Please file according to model size. .....

13 14

SPECIFICATIONS

■ KV-13M20/14R20/14RD1/14PM1/13M30/13M31

Television system	American TV standards
Channel coverage	VHF 2-13 UHF: 14-69 CATV: 1-125
Picture tube	Trinitron® tube 13-inch picture measured diagonally 14-inch picture measured diagonally
Antenna	75Ω external antenna terminal for VHF / UHF, F-Terminal
Input	VIDEO (phono jacks): 1Vp-p, 75Ω unbalanced negative sync Audio (phono jacks) 500 mVrms (100% modulation) Impedance: 47Ω A/V input (Rear) Front A/V input (KV-13M30/13M31 only)
Output	Headphone jack
Speaker output	1 speaker 2W(8Ω)
Speaker size	Full range 3 1/2 x 2 inches (90 x 50 mm)
Power requirements	120V AC, 60Hz
Power consumption	75W when in use 6W in standby
Dimensions (W/H/D)	14 1/8 x 13 1/2 x 15 3/4 in. (358 x 342 x 401.4 mm)
Weight	22 lbs.(10kg)
Supplied accessories	Remote Commander RM-Y116 (1) with 2 AA size (R6) battery Dipole antenna (1) Antenna connector (1)

Design and specifications are subject to change without notice.
SONY CORPORATION Printed in U.S.A.

SAFETY CHECK-OUT

(US model only)

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Check that all control knobs, shields, covers, ground straps, and mounting hardware have been replaced. Be absolutely certain that you have replaced all the insulators.
4. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
5. Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
6. Check the line cords for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
7. Check the condition of the monopole antenna (if any). Make sure the end is not broken off, and has the plastic cap on it. Point out the danger of impalement on a broken antenna to the customer, and recommend the antenna's replacement.
8. Check the B+ and HV to see they are at the values specified. Make sure your instruments are accurate, be suspicious of your HV meter if sets always have low HV.
9. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microamperes) . Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliampmeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

HOW TO FIND A GOOD EARTH GROUND

A cold-water pipe is guaranteed earth ground; the cover-plate retaining screw on most AC outlet boxes is also at earth ground. If the retaining screw is to be used as your earth-ground, verify that it is at ground by measuring the resistance between it and a cold-water pipe with an ohmmeter. The reading should be zero ohms. If a cold-water pipe is not accessible, connect a 60-100 watts trouble light (not a neon lamp) between the hot side of the receptacle and the retaining screw. Try both slots, if necessary, to locate the hot side of the line, the lamp should light at normal brilliance if the screw is at ground potential. (See Fig. B)

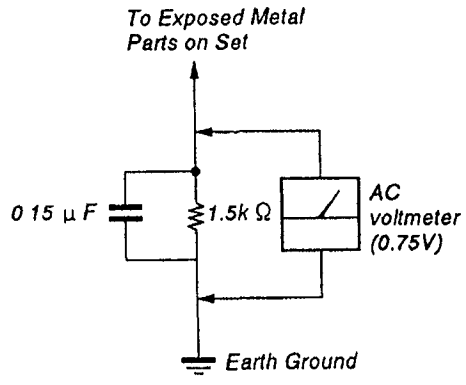


Fig. A. Using an AC voltmeter to check AC leakage.

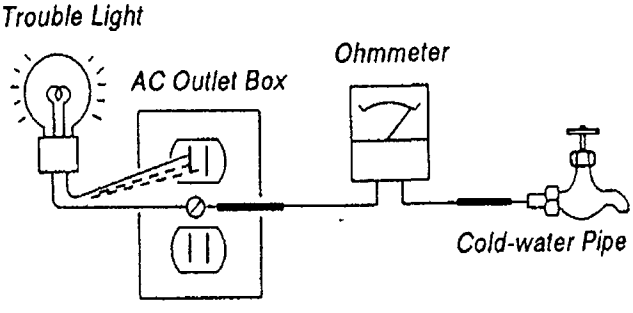


Fig B. Checking for earth ground.

TABLE OF CONTENTS

(CAUTION)

SHORT CIRCUIT THE ANODE OF THE PICTURE TUBE AND THE ANODE CAP TO THE METAL CHASSIS, CRT SHIELD, OR CARBON PAINTED ON THE CRT, AFTER REMOVING THE ANODE

WARNING!!

AN ISOLATION TRANSFORMER SHOULD BE USED DURING ANY SERVICE TO AVOID POSSIBLE SHOCK HAZARD, BECAUSE OF LIVE CHASSIS.
THE CHASSIS OF THIS RECEIVER IS DIRECTLY CONNECTED TO THE AC POWER LINE.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS, AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

SECTION 1
GENERAL

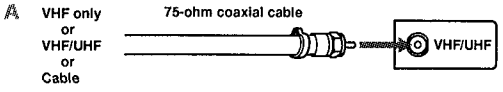
The operating instructions mentioned here are partial abstracts from the Operating Instruction Manual. The page numbers of the Operating Instructions remain as in the manual.

Step 1: Connecting the TV

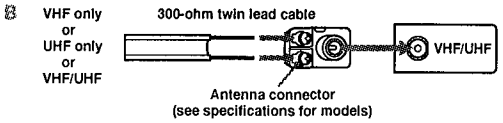
You can use an indoor antenna, outdoor antenna, or cable system with your TV. Outdoor antennas or cable TV systems usually provide the best picture quality.

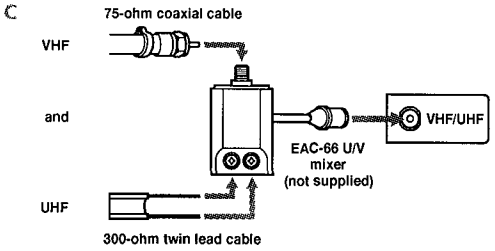
Connecting an Indoor, Outdoor or Cable Antenna

Connect your antenna or cable to the TV's VHF/UHF antenna terminal



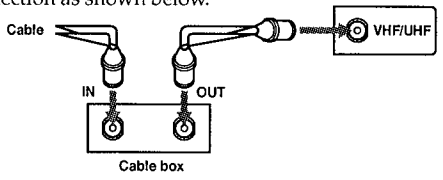
If you cannot connect your antenna or cable directly to the TV antenna terminal, follow one of the diagrams below





Connecting to a Cable TV System Through a Cable Box

If your cable system requires use of a cable box, make the connection as shown below.



Connecting a VCR

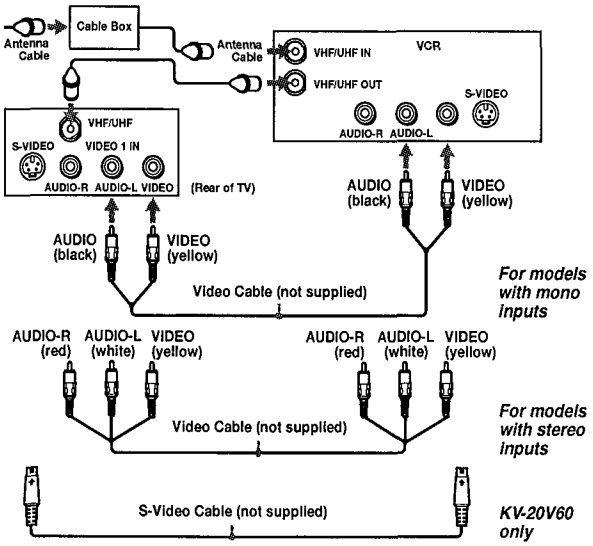
See your VCR instructions to set up the VCR. After connecting the VCR to the TV, you will be able to do the following:

- Watch video tapes
- Record one TV program while viewing another

Check the model number of your TV and select the appropriate connection diagram

Notes

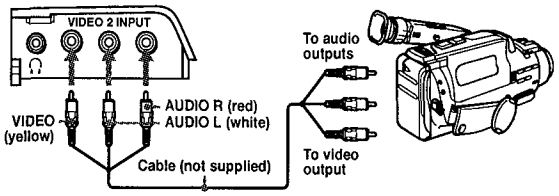
- If your cable system requires use of a Cable Box, install it between the VCR and the TV.
- For a monaural VCR, connect the audio output of the VCR to AUDIO L (MONO) on the TV
- Connect your S-Video cable (KV-20V60 only) to the S-Video input on the TV S-Video will override your standard video input, providing the most stable picture



Connecting a Camcorder

KV-13M30, 13M31, 20S30, 21RS30C only

Use this connection to view a video tape from a camcorder.



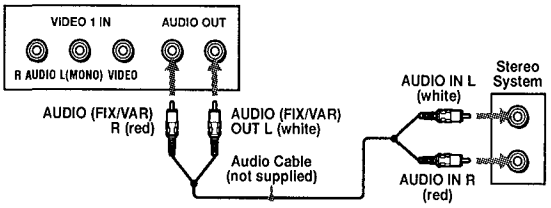
Notes

- For a monaural camcorder, connect the audio output of the camcorder to AUDIO L (MONO) on the TV
- If you are connecting your camcorder to a monaural TV (KV-13M30, 13M31 only), plug the audio connector into the AUDIO input on the TV
- You can also connect a camcorder to inputs on the rear of the TV

Connecting an Audio System

KV-20S30, 21RS30C only

To listen to TV audio through a separate stereo system, connect the TV as shown below. See page 11 to switch to the external speakers.



Step 2: Using the Remote Control

Instructions in this manual are based on using the remote control. You can also use the controls on the TV.

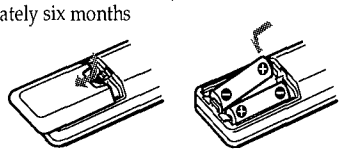
The menu illustrations are from KV-20M20 When features found on other models are discussed, the manual lists the models covered by that specific set of menus.

Note

- The menu disappears 90 seconds after you press a button, or immediately after you press MENU

Inserting Batteries

Insert two size AA (R6) batteries (supplied) by matching the + and – on the batteries to the + and – inside the battery compartment. With normal use, the batteries should last for approximately six months



Notes

- Remove the batteries to avoid possible damage from battery leakage if you will not be using the remote control for an extended period of time
- Handle the remote control with care Avoid dropping it, getting it wet, or placing it in direct sunlight, near a heater, or where the humidity is high

Changing the Menu Language

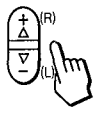
Except Canadian models

If you want to view the menus in Spanish, you can change the menu language

1 **Press MENU. The Main menu appears.**

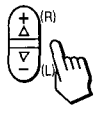
2 **Press △+ or ▽– to move the cursor (▶) to ENGLISH and press RETURN.**

ENGLISH will turn red



3 **Press △+ or ▽– to select ESPAÑOL and press RETURN.**

ESPAÑOL will turn green



4 **Press MENU to return to the TV program.**

Note

- Some parts of the Spanish menus will appear in English

Step 3: Setting up Your Channels

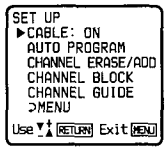
Setting Cable TV On or Off

If you have connected the TV to a cable TV system, set CABLE to ON If not, set CABLE to OFF

1 **Press MENU.**

2 **Move the cursor to SET UP and press RETURN.**

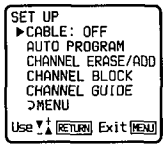
3 **Move the cursor to CABLE and press RETURN.**



4 **Press △+ or ▽– to select ON or OFF.**

5 **Press RETURN.**

6 **Press MENU to return to the TV program.**



Note

- If the screen is black, the TV is set to a video input and you cannot select CABLE Press TV/VIDEO until a channel number appears, then follow steps 1–6

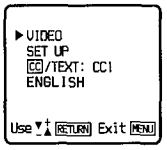
Auto Programming Your Channels

TV channels can be preset easily. First, you can store all the receivable channels automatically. Later, you can erase unwanted channels or add additional channels.

Notes

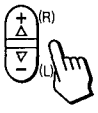
- If the TV is set to VIDEO, you cannot run AUTO PROGRAM Press TV/VIDEO on the remote control until a channel number appears
- It is usually best to preset channels during the day when the greater number of channels are broadcasting

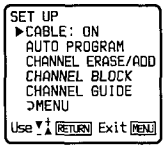
1 **Press MENU. The Main menu appears.**



2 **Press △+ or ▽– on the remote control to move the cursor (▶) to SET UP. Press RETURN.**

The SET UP menu appears





3 **Press △+ or ▽– to move the cursor to AUTO PROGRAM and press RETURN.**

AUTO PROGRAM appears on the screen and the TV starts scanning and presetting channels

When all of the receivable channels are stored, AUTO PROGRAM disappears.

Note

- AUTO PROGRAM will tune in all of the channels in your area, including some with weak or scrambled signals They will appear fuzzy on the screen You can erase them using CHANNEL ERASE/ADD

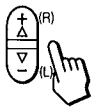
Erasing or Adding Channels

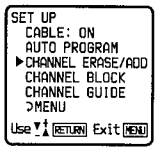
After you run AUTO PROGRAM, you can erase unnecessary channels or add new ones.

1 **Press MENU.**

2 **Press △+ or ▽– to select SET UP and press RETURN.**

3 **Press △+ or ▽– to select CHANNEL ERASE/ADD and press RETURN.**



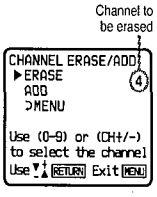


4 **To erase or add an unwanted channel:**

(1) Press CH +/– or 0–9 to select the channel you want to erase or add.

(2) Press △+ or ▽– to select ERASE or ADD.

(3) Press RETURN



If you are erasing a channel, the "–" symbol appears next to the channel number If you are adding a channel, the "+" symbol appears next to the channel number.

5 **To erase or add other channels, repeat step 4.**

6 **Press MENU to return to the TV program.**

Note

- If you erase or add a VHF or UHF channel, the cable TV channel with the same number is also erased or added

Watching the TV

Press POWER to turn the TV on.

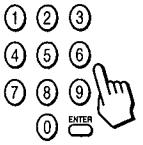
Note

- If VIDEO appears on the screen, press TV/VIDEO so that a channel number appears

Selecting a Channel Directly

Press 0–9 to select a channel.

The channel will change after 2 seconds, or you can press ENTER for immediate selection



Scanning Through Channels

Press CH +/– until the channel you want appears.

Jumping Quickly Between Two Channels

Press JUMP.

The TV switches from the current channel to the previous channel that you watched.

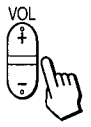
Pressing JUMP again switches back to the first channel.

Note

- You can only jump to channels you have selected with the 0–9 keys, or back to the last channel you scanned

Adjusting the Volume

Press VOL +/– to adjust the volume.



Muting the Sound

Press MUTING.

MUTING appears on the screen

To restore the sound, press MUTING again, or press VOL +

Displaying On-Screen Information

Use the DISPLAY key to check the TV's Display settings

1 **Press DISPLAY.**

The channel number will be displayed. The TV will also display the MTS mode if SAP, MAIN, or MONO are selected (except KV-13M20, 13M30, 20M20) The MTS mode display disappears after 4 seconds

2 **Press DISPLAY again.**

XDS ON will appear on the screen If XDS (Extended Data Service) is broadcasting, information will then appear on the screen (except KV-13M20, 14PM1, 14R20, 14R20C, 14RD1)

3 **Press DISPLAY again.**

CC1 ON (if selected) will appear on the screen for a few seconds. Captions will then appear at the top or bottom of the screen.

4 **To turn off Caption Vision or XDS display, press DISPLAY again until DISPLAY OFF appears.**

Note

- See page **13** for more information about Caption Vision

Watching Video Tapes

1 **Press TV/VIDEO until the correct video input appears.**

2 **Press PLAY on your VCR to view the video tape.**

Setting the Sleep Timer

Sleep Timer allows the TV to stay on for a length of time and then shut off automatically

1 **Press SLEEP until the time you want appears.**

Each time you press SLEEP, the display moves between 30, 60, 90, and OFF

In a few seconds, the SLEEP message disappears.

TV WILL BE OFF SOON appears one minute before the TV shuts off

2 **To cancel the Sleep Timer, press SLEEP again until SLEEP OFF appears, or turn off the TV.**

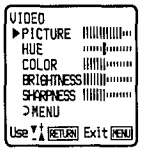
Using the VIDEO Menu

Adjusting the Video Settings

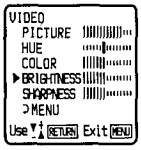
You can adjust the picture, hue, color, brightness, and sharpness of any TV image.

1 **Press MENU.**

2 **Move the cursor (▶) to VIDEO and press RETURN.**

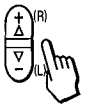


3 **Press △+ or ▽– to select the feature that you want to adjust and press RETURN.**



See the Adjustable Items chart for a list of the adjustments you can make

4 **Press △+ or ▽– to adjust the setting of the selected feature and press RETURN.**



The new setting appears in the VIDEO menu

5 **To adjust other video settings, repeat steps 3 and 4.**

6 **Press MENU to return to the TV program.**

ADJUSTABLE ITEMS

Item	*Press △+ (R) to*	*Press ▽– (L) to*
PICTURE	Increase the contrast	Decrease the contrast
HUE	Increase the green tones	Decrease the green tones
COLOR	Increase color intensity	Decrease color intensity
BRIGHTNESS	Brighten the picture	Darken the picture
SHARPNESS	Sharpen the picture	Soften the picture

Restoring the Factory Video Settings

1 **To restore the factory video settings, press RESET while the VIDEO menu is displayed.**

All the settings except PICTURE are restored to factory settings

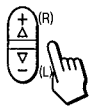
Additional Features

Selecting Stereo or Bilingual Programs (MTS)

KV-20S20, 20S21, 20S30, 20V60, 21PS1, 21RS20, 21RS20C, 21RS30C, 21SD1 only. Menus shown are for KV-20S20.

The Multichannel TV Sound (MTS) feature allows you to enjoy stereo sound (MAIN), Second Audio Programs (SAP), or monaural sound (MONO) when available

1. **Press MENU.**
2. **Move the cursor to AUDIO and press RETURN.**
3. **Move the cursor to MTS and press RETURN.**
4. **Press △+ or ▽– to select MAIN, SAP, or MONO.**
5. **Press MENU to return to the TV program.**



Choose	To
MAIN	Listen to stereo sound
SAP	Listen to bilingual and other programs
MONO	Reduce noise during poor stereo broadcasts.

Note

- The sound of non-SAP programs will be muted when SAP is selected If there is no SAP audio, you may hear unrelated audio in English

Setting the Speaker Switch (SPEAKER)

KV-20S30, 20V60, 21RS30C only.

You may switch off the TV speakers when you want to listen to the TV sound through a separate stereo system

1. **Press MENU.**
2. **Move the cursor to AUDIO and press RETURN.**
3. **Move the cursor to SPEAKER and press RETURN.**
4. **Press △+ or ▽– to select ON or OFF.**
5. **Press MENU to return to the TV program.**

Choose	To
ON	Listen to the sound from the TV
OFF	Turn off the TV speaker and listen to the TV's sound through external audio system speakers

Changing Audio Out Speaker Volume

KV-20S30, 20V60, 21RS30C only.

You can control the volume of the TV program when you play the TV sound through a separate stereo system.

1. **Press MENU.**
2. **Move the cursor to AUDIO and press RETURN.**
3. **Move the cursor to SPEAKER and press RETURN.**
4. **Press △+ or ▽– to set SPEAKER to OFF. Press RETURN.**

5. **Move the cursor to FIXED or VARIABLE and press RETURN. Your selection will turn yellow.**
6. **Press MENU to return to the TV program.**

Choose	To
FIXED	Adjust the volume with your stereo
VARIABLE	Adjust the volume through the TV

Note

- Set the volume on your stereo low when switching from VAR to FIXED to avoid overloading your speakers

Turning on Surround Sound

KV-20V60 only

Use this feature to listen to TV audio in Surround Sound mode

1. **Press MENU.**
2. **Move the cursor (▶) to AUDIO and press RETURN.**
3. **Move the cursor to SURROUND and press RETURN.**
4. **Press △+ or ▽– to set Surround ON or OFF.**
5. **Press MENU to return to the TV program.**

Adjusting Treble, Bass, and Balance

KV-20V60 only

1. **Press MENU.**
2. **Move the cursor (▶) to AUDIO and press RETURN.**
3. **Move the cursor to TREBLE, BASS, or BALANCE and press RETURN.**

Choose	To
TREBLE	Increase or decrease high pitch sounds
BASS	Increase or decrease low pitch sounds
BALANCE	Change the balance between speakers

4. **Press △+ or ▽– to increase or decrease the setting.**
5. **Press RETURN to make other audio adjustments.**
6. **Press MENU to return to the TV program.**

Restoring the Factory Audio Settings

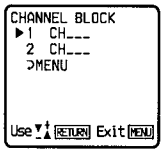
1. **To restore the factory audio settings, press RESET while the AUDIO menu is displayed.**

Blocking Out a Channel (CHANNEL BLOCK)

This feature allows you to prevent children from watching selected channels.

1. **Press MENU.**
2. **Move the cursor to SET UP and press RETURN.**
3. **Move the cursor to CHANNEL BLOCK and press RETURN.**

4 **Move the cursor to 1 or 2 and press RETURN.**



5 **Press △+ or ▽– to select the channel that you want to block. Press RETURN.**

6 **Repeat steps 4 and 5 to enter the second channel that you want to block.**

7 **Press MENU to return to the TV program.**

If you switch to the blocked channel, BLOCKED appears The screen is black and the sound is muted

To cancel a CHANNEL BLOCK setting

1 **Follow steps 1–4 above.**

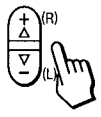
2 **Press RESET.**

Selecting a Caption Vision Option

Caption Vision options include CC1, 2, 3, and 4, or TEXT1, 2, 3, and 4. CC1, 2, 3, and 4 show a caption or printed version of the dialog or sound effects of a program. CC1 will be the setting for most programs TEXT1, 2, 3, and 4 show text information on half of the screen. This text is not usually related to the program.

1 **Press MENU.**

2 **Press △+ or ▽– to select [CC/TEXT: CC1] and press RETURN.**



3 **Press △+ or ▽– to select the caption type (CC1, 2, 3, 4, or TEXT1, 2, 3, or 4) and press RETURN.**

4 **Press MENU to return to the TV program.**

5 **To view Caption Vision, press DISPLAY several times until CC1, 2, 3, 4, or TEXT1, 2, 3, 4 ON is displayed if broadcasting.**

The caption will appear in a few seconds.

6 **To turn off Caption Vision, press DISPLAY until DISPLAY OFF appears.**

Notes

- Captions disappear for a few seconds when you press the MUTING button
- Captions may appear with a white box or other errors if you have poor reception of the channel

Customizing the Channel Number Buttons (CHANNEL GUIDE)

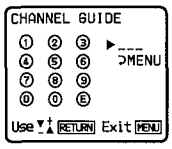
You can assign up to 12 of your favorite channels to Channel Guide locations and switch to them with the Channel Guide.

1 **Press MENU.**

2 **Press △+ or ▽– to select SET UP and press RETURN.**

3 **Press △+ or ▽– to select CHANNEL GUIDE and press RETURN.**

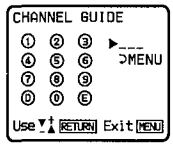
4 **Press RETURN again to move the cursor to the number pad.**



5 **Press △+ or ▽– to select a number on the Channel Guide (the button number will turn red) and press RETURN.**

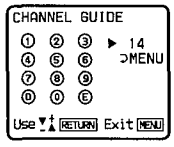
The _ _ _ turns red.

Buttons 0–9, DISPLAY (D) and ENTER (E) are available for Channel Guide access.



6 **Press △+ or ▽– to select the channel that you want to assign to that button, and press RETURN.**

The TV will switch to that channel.



7 **Repeat steps 5–7 to set other channels.**

8 **Press MENU to return to the current TV program.**

To remove a CHANNEL GUIDE setting

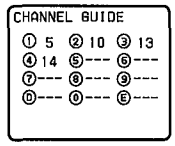
1 **Repeat steps 1–6 to select the channel that you want to remove.**

2 **Press RESET.**

Using the Channel Guide

1 **Press CH GUIDE.**

The Channel Guide shows button numbers and the channels assigned to them

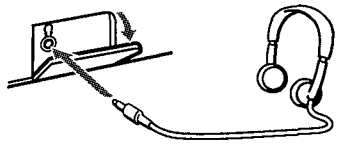


2 **Press 0–9, DISPLAY or ENTER on the remote control to switch to the channel you want to view.**

3 **To cancel the CHANNEL GUIDE display without selecting a channel, press CH GUIDE again.**

Listening with Headphones or an Earphone

Plug the headphones or earphone into the jack on the front of the TV. Using headphones will turn off the sound to the TV speakers KV-13M20 is shown below

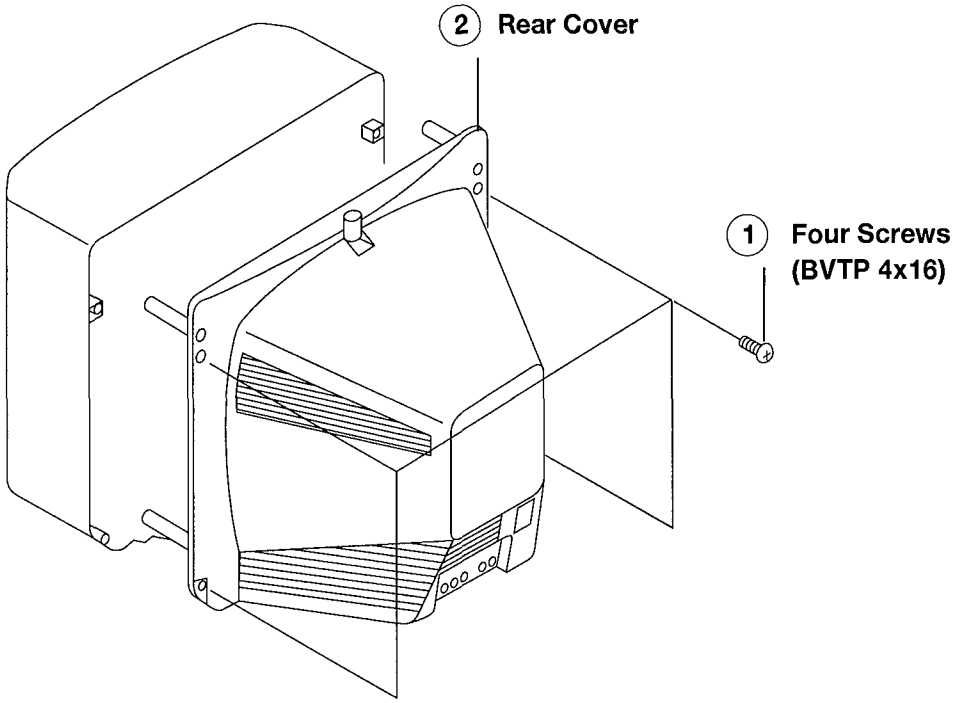


Notes

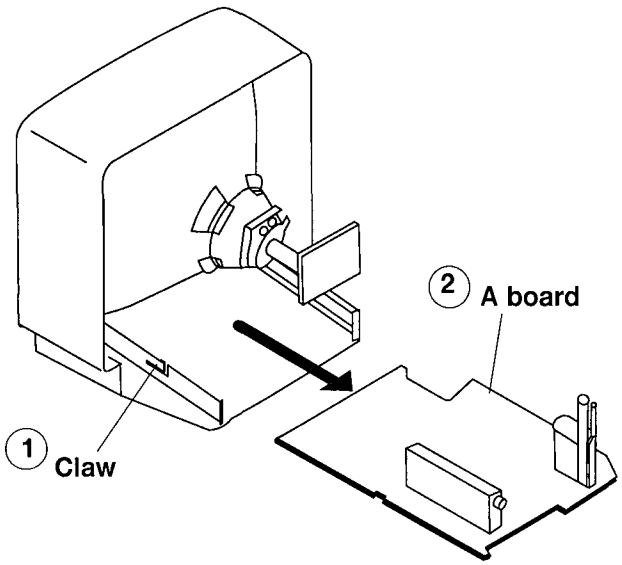
- To prevent hearing damage due to sudden or prolonged excessive volume, do not set the volume too high while listening
- If your TV is monaural, the monaural sound will be heard from both headphones

SECTION 2
DISASSEMBLY

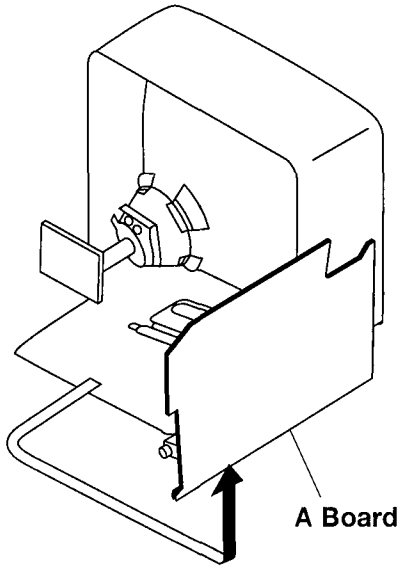
2-1. REAR COVER REMOVAL



2-2. A BOARD REMOVAL



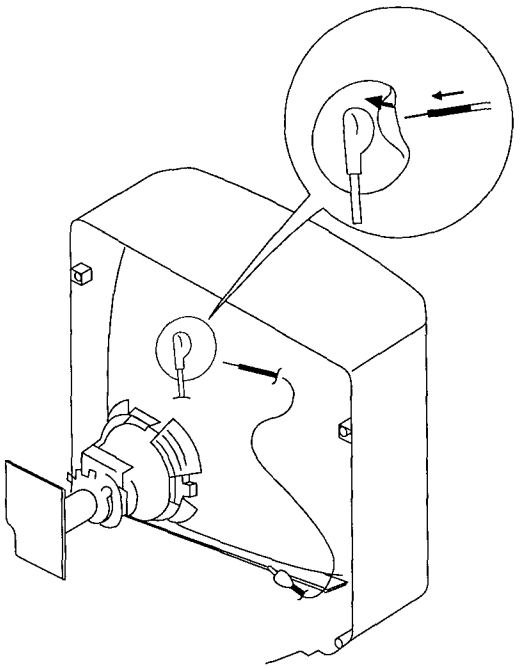
2-3. SERVICE POSITION



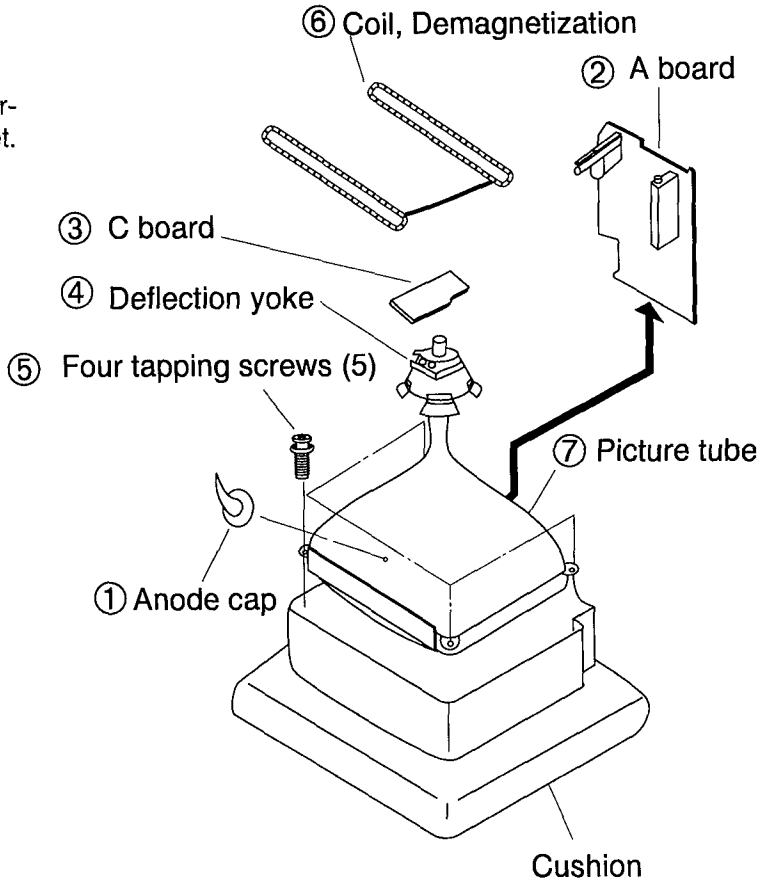
WARNING **Before removing anode cap:**

H.V. remains in the CRT even after the power is disconnected.

To avoid electrical shock before attempting to remove the anode cap, discharge CRT by shorting between anode and CRT mounting bracket.



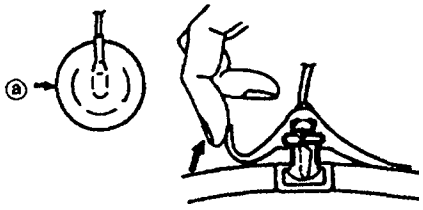
2-4. PICTURE TUBE REMOVAL



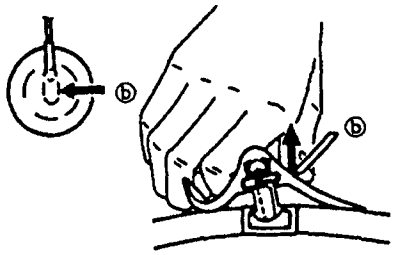
- **REMOVAL OF ANODE-CAP**

NOTE: Short circuit the anode of the picture tube and the anode cap to the metal chassis, CRT shield or carbon painted on the CRT after removing the anode.

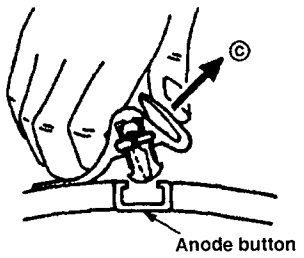
- **REMOVING PROCEDURES**



① Turn up one side of the rubber cap in the direction indicated by the arrow ⓐ.



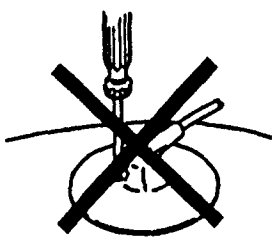
② Using a thumb pull up the rubber cap firmly in the direction indicated by the arrow ⓑ.

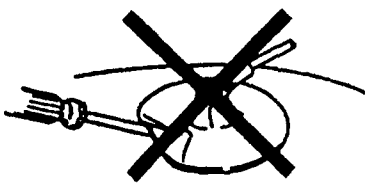


③When one side of the rubber cap is separated from the anode button, the anode-cap can be removed by turning up the rubber cap and pulling it up in the direction of the arrow ⓒ.

- **HOW TO HANDLE AN ANODE-CAP**

① Don't damage the surface of anode-caps with sharp shaped material!
② Don't press the rubber so as not to damage the inside of anode-caps. A material fitting called a shatter-hook terminal is built into the rubber cap.
③ Don't turn over the foot of rubber cap. The shatter-hook terminal will stick out or damage the rubber cap.





SECTION 3
SET-UP ADJUSTMENTS

- The following adjustments should be made when a complete realignment is required or a new picture tube is installed.
- These adjustments should be performed with rated power supply voltage unless otherwise noted.

The controls and switch should be set as follows unless otherwise noted:

PICTURE control ..... normal

BRIGHTNESS control ..... normal

Perform the adjustments in order as follows:

1. Beam Landing
2. Convergence
3. Focus
4. Screen (G2) and White Balance

Note: Test Equipment Required

1. Color Bar Pattern Generator
2. Degausser
3. DC Power Supply
4. Digital Multimeter

Preparation:

- Feed in the white pattern signal.
- Before starting, degauss the entire screen.

3-1. BEAM LANDING

1. Input a raster signal with the pattern generator.
2. Loosen the deflection yoke mounting screw, and set the purity control to the center as shown in Fig.2.
3. Turn the raster signal of the pattern generator to green.
4. Move the deflection yoke backward, and adjust with the purity control so that green is in the center and red and blue are at the sides evenly. (Fig.3)
5. Move the deflection yoke forward, and adjust so that the entire screen becomes green. (Fig.1)
6. Switch over the raster signal to red and blue and confirm the condition.
7. When the position of the deflection yoke is determined, tighten it with the deflection yoke mounting screw.
8. When landing at the corner is not right, adjust by using the disk magnets. (Fig.4)

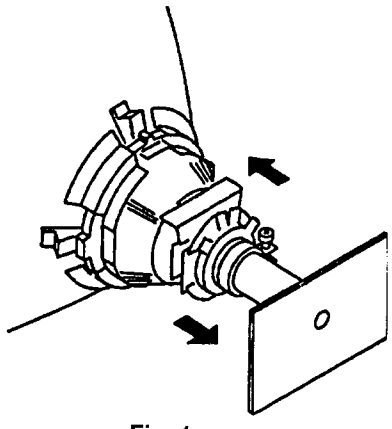


Fig. 1

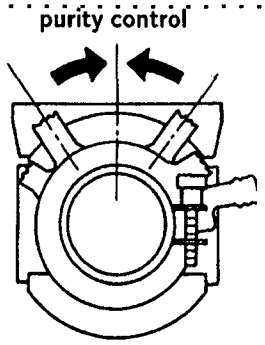


Fig. 2

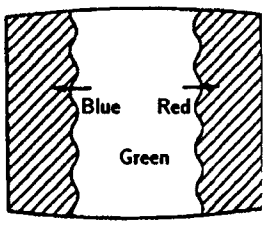


Fig. 3

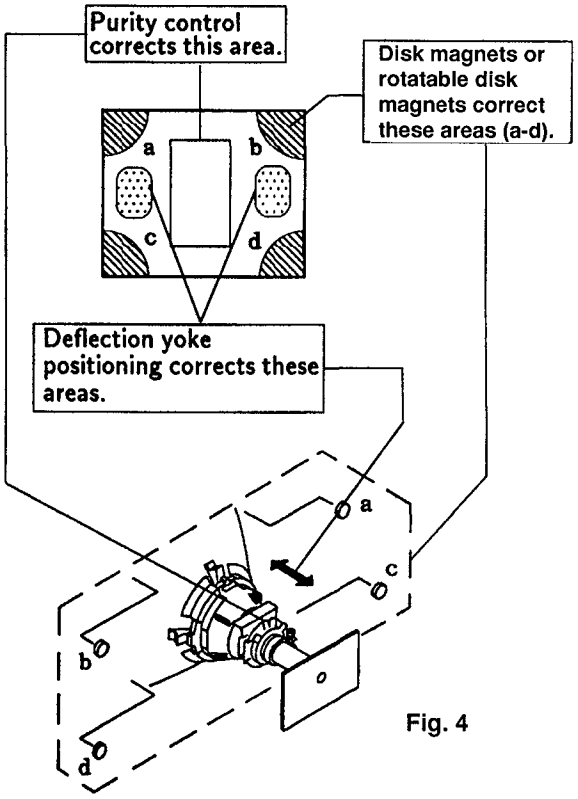


Fig. 4

3-2. CONVERGENCE

Preparation:

- Before starting, perform FOCUS, V. LIN and V. SIZE adjustments.
- Set BRIGHTNESS control to minimum.
- Feed in dot pattern.

(1) Vertical Static Convergence

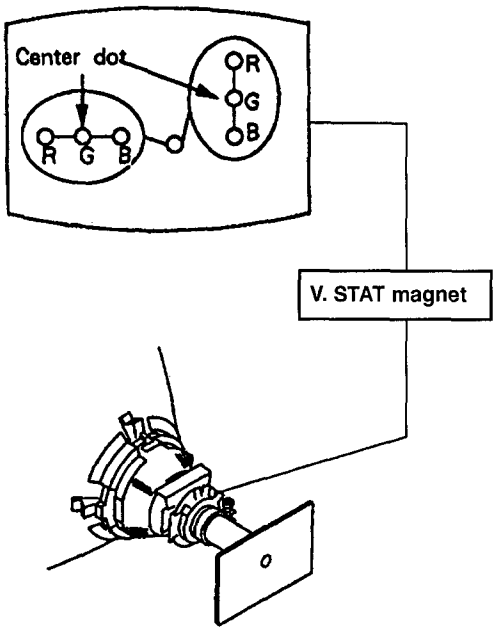
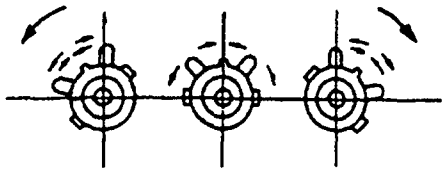


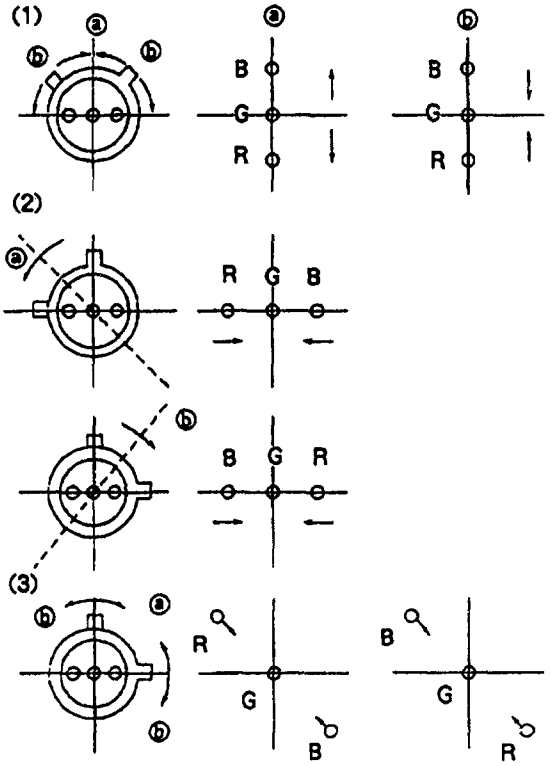
Fig. 5

1. Adjust V. STAT magnet to converge red, green and blue dots in the center of the screen. (Vertical movement)

- Tilt the V. STAT magnet and adjust static convergence to open or close the V. STAT magnet.



2. When the V. STAT magnet is moved in the direction of arrow (a) and (b), red, green, and blue dots move as shown below.



If the blue dot does not converge with red and green dots, perform the following steps:

Move BMC magnet (a) to correct insufficient H. Static convergence.

Rotate BMC magnet (b) to correct insufficient V. Static convergence.

In either case, repeat Beam Landing Adjustment.

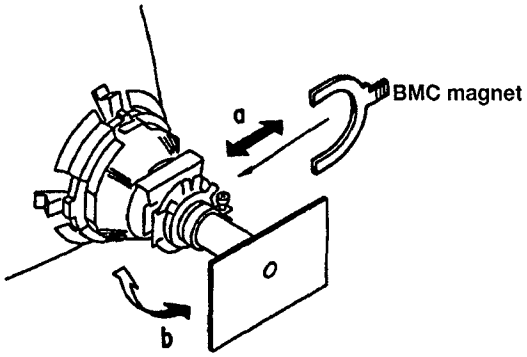


Fig. 6

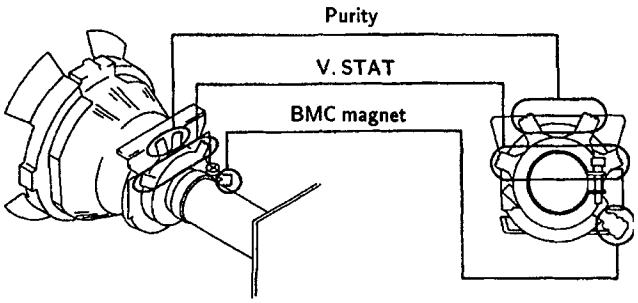


Fig. 7

(2) **Dynamic Convergence Adjustment**

Preparation:

- Before starting to perform Horizontal and Vertical Static Convergence Adjustment.

1. Slightly loosen deflection yoke screw.
2. Remove deflection yoke spacers.
3. Move the deflection yoke for best convergence as shown below.
4. Tighten the deflection yoke screw.
5. Install the deflection yoke spacers.

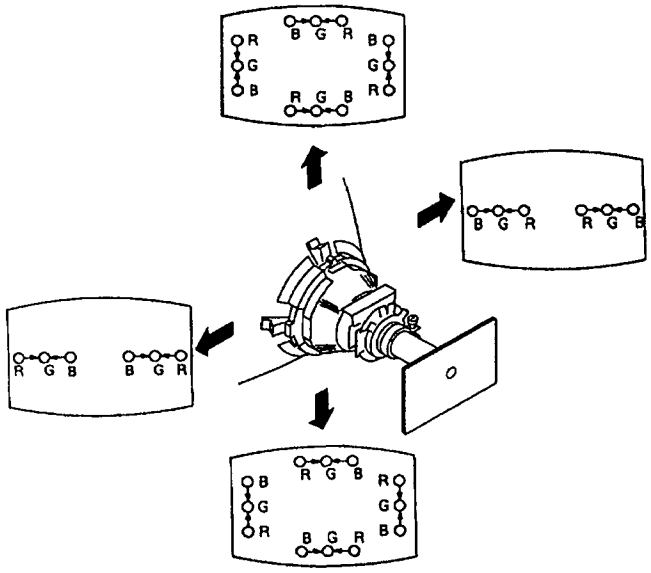


Fig. 8

(3) Screen-corner Convergence

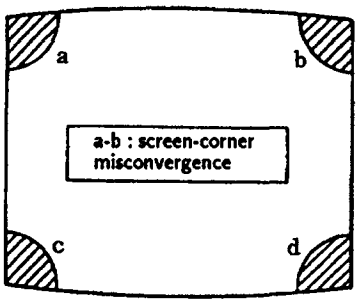
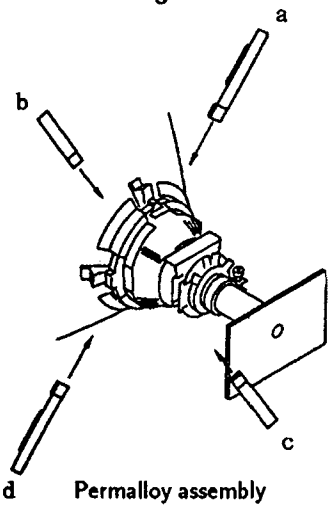


Fig. 9

Affix a Permalloy ass'y corresponding to the misconverged areas



Permalloy assembly

3-3. FOCUS

Adjust FOCUS (RV703) control for best picture.

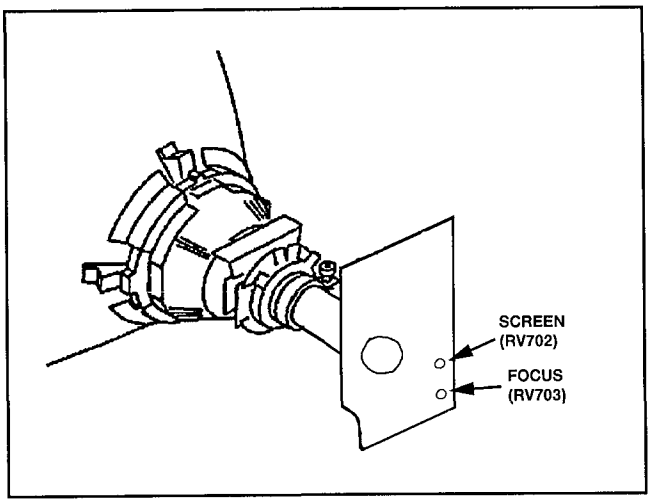


Fig. 10

3-4. SCREEN (G2)

1. Input a dots pattern.
2. Set the PICTURE and BRIGHT controls at minimum and COLOR controls at normal.
3. Adjust SBRT, GCUT, BCUT in service mode so that voltages on the red, green and blue cathodes are 160 Vdc with an oscilloscope as shown in Fig.11.
4. Observe the screen and adjust SCREEN (G2 RV 702) to obtain the faintly visible background of dot signal.

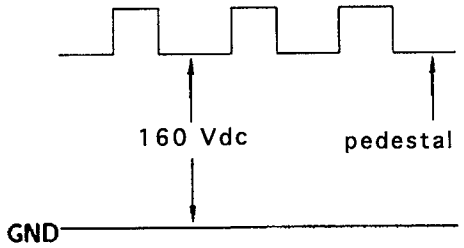


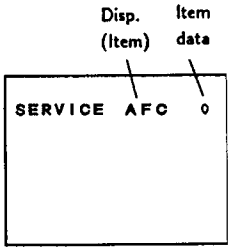
Fig. 11

3-5. METHOD OF SETTING THE SERVICE ADJUSTMENT MODE

SERVICE MODE PROCEDURE

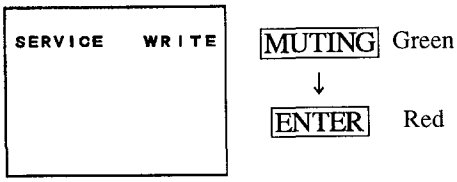
1. Standby mode. (Power off)
2. DISPLAY → 5 → VOL(+) → POWER on the Remote Commander. (Press each button within a second.)

SERVICE ADJUSTMENT MODE IN



3. The CRT displays the item being adjusted.
4. Press 1 or 4 on the Remote Commander to select the item.
5. Press 3 or 6 on the Remote Commander to change the data.
6. Press MUTING then ENTER to write into memory.

SERVICE ADJUSTMENT MODE MEMORY



7. Turn set off and on to exit.

3-6. WHITE BALANCE ADJUSTMENTS

1. Input an entire white signal.
2. Set to Service adjustment Mode.
3. Set the PICTURE and BRIGHT to minimum.
4. Adjust with SBRT if necessary.
5. Select GCUT and BCUT with 1 and 4.
6. Adjust with 3 and 6 for the best white balance.
7. Set the PICTURE and BRIGHT to maximum.
8. Select GDRV and BDRV with 1 and 4.
9. Adjust with 3 and 6 for the best white balance.
10. Write into the memory by pressing MUTING then ENTER.

SECTION 4
SAFETY RELATED ADJUSTMENTS

A BOARD

⊠ R525 CONFIRMATION METHOD (HV HOLD-DOWN CONFIRMATION) AND READJUSTMENTS

The following adjustments should always be performed when replacing the following components (marked with ◪ on the schematic diagram).

IC301, IC502, IC601, D505, D506, D507, D510, DY, C503, C511, C513, C528, R511, R519, R520, R523, R525, R527, R559, R560, R617, R618, R652, R653, R654, T504 (FBT)

1. PREPARATION BEFORE CONFIRMATION

   1) Turn the POWER switch ON. Input an entirely white signal and set the PICTURE and BRIGHT controls to maximum.
   2) Confirm that the voltage at TP-85 is more than 90VDC when the set is operating normally with 120.0 ± 2.0 VAC supply.

2. HOLD-DOWN OPERATION CONFIRMATION

   1) Connect the current meter between Pin 11 of the FBT (T504) and the PCB land where Pin 11 would normally attach.
   2) Input a white signal and adjust the ABL current to be 1040 ± 100μA using the PICTURE and the BRIGHT controls.
   3) Confirm the voltage of A board TP-91 is 113.4 ± 0.3VDC.
   4) Connect the Digital Voltmeter and DC power supply via 1SS119 to TP-85.
   5) Increase the DC power voltage gradually until the picture blanks out.
   6) Read the digital voltmeter indication.
   7) Turn DC power source off immediately.

      STANDARD

      Less than or equal to 117.75 VDC

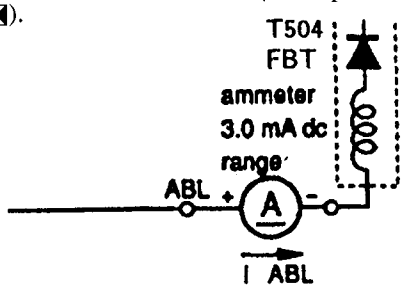
   8) Input a dot signal and adjust the ABL current to be 40+100/-40μA using the PICTURE and the BRIGHT controls.
   9) Confirm the voltage of A board TP-91 is 116.4 ± 0.3VDC.
   10) Repeat steps from (4) to (7).

      STANDARD

      Less than or equal to 117.75 VDC

3. HOLD-DOWN READJUSTMENT

   If the current setting indicated in step 2-2 cannot be met, readjustment should be performed by altering the resistance value of R525 (a component marked with ⊠).

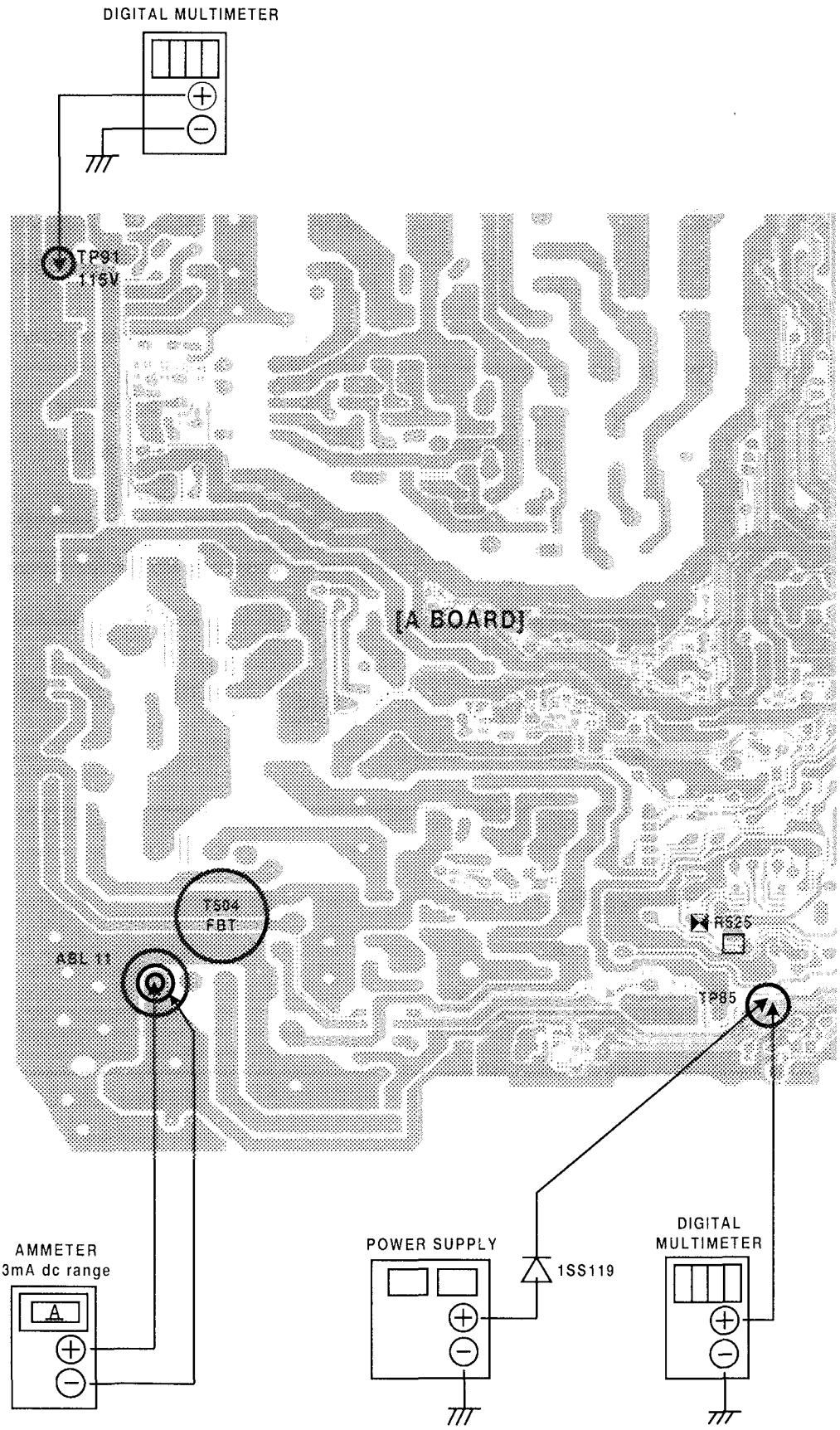


B+ VOLTAGE CONFIRMATION AND ADJUSTMENT

The following adjustments should always be performed when replacing the following components. (marked with ◪ on the schematic diagram).

IC001, IC601, R030, R617, R618, R629, R630, R651, R652, R653, R654, R655, R656

1) Supply $130 \pm {}^{2.0}_{0}$ V AC to the set with a variable auto transformer.
2) Input a dot signal.
3) Set the PICTURE control and the BRIGHT control to minimum condition.
4) Set to Service adjustment Mode.
5) Select PADJ with [1] and [4].
6) Adjust with [6] to the 0 level.
7) Confirm the voltage of A BOARD TP-91 is less than 123.0V DC.
8) If step 7 is not satisfied, replace the components, repeat the above steps.
9) Supply 120.0 ± 2.0 VAC to the set with a variable auto transformer.
10) Adjust with [3] and [6] for the 116.4 ± 0.3 VDC.
11) Write into the memory by pressing [MUTING] then [ENTER].


DIGITAL MULTIMETER
TP91
11SV
[A BOARD]
T504
FBT
ASL 11
R525
TP85
AMMETER
3mA dc range
POWER SUPPLY
1SS119
DIGITAL
MULTIMETER

SECTION 5
CIRCUIT ADJUSTMENTS

5-1. ELECTRICAL ADJUSTMENT BY REMOTE COMMANDER

Use Remote Commander (RM-Y116) to perform circuit adjustments on this model.

NOTE : Test Equipment Required.

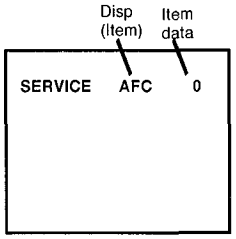
1. Pattern Generator
2. Frequency Counter
3. Digital Multimeter
4. Audio OSC

1. METHOD OF SETTING THE SERVICE ADJUSTMENT MODE

SERVICE MODE PROCEDURE

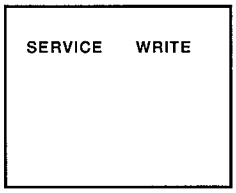
1. Standby mode. (Power off)
2. [DISPLAY] → [5] → [VOL (+)] → [POWER] on the Remote Commander. (Press each button within a second.)

SERVICE ADJUSTMENT MODE IN



3. The CRT displays the item being adjusted.
4. Press [1] or [4] on the Remote Commander to select the item.
5. Press [3] or [6] on the Remote Commander to change the data.
6. Press [MUTING] then [ENTER] to write into memory.

SERVICE ADJUSTMENT MODE MEMORY

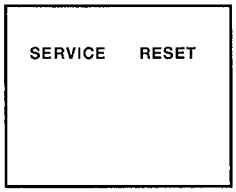


[MUTING] Green

↓

[ENTER] Red

7. Press [8] then [ENTER] on the Remote Commander to initialize.



Carry out step 7 when adjusting IDs 0 to 4 and when replacing and adjusting IC003.

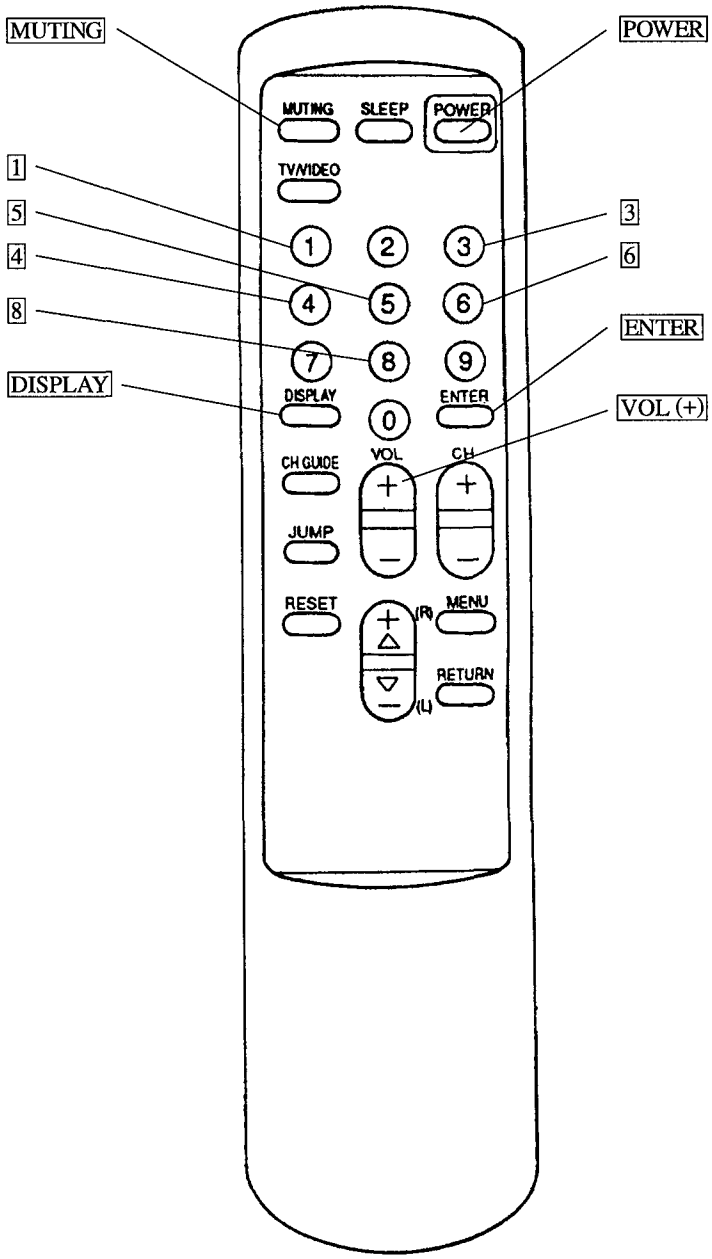
Factory original setting

8. Turn set off and on to exit.

2. MEMORY WRITE CONFIRMATION METHOD

1. After adjustment, pull out the plug from the AC outlet, then replace the plug in the AC outlet again.
2. Turn the power switch ON and set to service mode.
3. Call the adjusted items again to confirm they were adjusted.

3. ADJUST BUTTONS AND INDICATOR



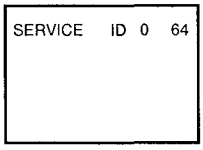
RM-Y116

4. AN ITEM OF ADJUSTMENTS

No.	Disp.	Item	Data range	Avg. data
1	SYS	Color System	0~3	1
2	AFC	AFC Loop Gain	0~3	*1
3	VPOS	V. Position	0~31	15
4	VSIZ	V. Size	0~63	22
5	VLIN	V. Linearity	0~15	6
6	VSCO	S. Correction	0~15	5
7	HPOS	H. Position	0~15	9
8	GDRV	Green-Drive	0~31	18
9	BDRV	Blue-Drive	0~31	15
10	GCUT	Green-Cutoff	0~15	6
11	BCUT	Blue Cut Off	0~15	6
12	TOT	Chroma TOT-Filter	0, 1	*1
13	NR	Noise Reduction	0, 1	*0
14	SCON	Sub-Contrast	0~15	8
15	SHUE	Sub-Hue	0~15	9
16	SCOL	Sub-Color	0~15	11
17	SBRT	Sub-Brightness	0~63	34
18	SSHP	Sub-Sharpness	0~15	9
19	RON	Red-Off	0, 1	*1
20	GON	Green-Off	0, 1	*1
21	BON	Blue-Off	0, 1	*1
22	PREL	Pre-Over Shoot	0~7	4
23	AXIS	Axis SW	0, 1	1
24	DCOL	Dynamic-Color	0, 1	*0
25	REF	Reference-Position	0~3	2
26	ABLM	ABL Mode	0~3	2
27	CROM	Chroma Trap SW	0, 1	1
28	OSDL	OSD Level	0, 1	0
29	Y-DC	DC Transmission	0~7	1
30	GAMM	Gamma	0~7	0
31	VEXT	V Sync Extend	0, 1	1
32	VZOM	HV Comp	0~7	4
33	CDMD	V Countdown	0, 1	0
34	RGBL	RGB Limit	0~3	0
35	YDLY	Y Delay	0~3	0
36	SBAL	Left-Volume	0~15	7
37	SBAS	Sub-Bass	0~15	7
38	STRE	Sub-Treble	0~15	7
39	PHOR	Horizontal Size	0~63	15
40	PE-W	E-W Correction	0~63	30
41	PCOR	E-W Corner	0~15	8
42	PTRP	Trap Correction	0~63	0
43	HCMP	H Compensation	0~15	8
44	DISP	Display Position	0~63	8
45	PADJ	B+ Adjustment	0~63	38
46	ID-0	ID-0	0~256	by Model
47	ID-1	ID-1	0~256	by Model
48	ID-2	ID-2	0~256	by Model
49	ID-3	ID-3	0~256	by Model
50	ID-4	ID-4	0~256	by Model

* · Set-up value

Note: No.1 through 50 show adjustment order.



Note: IC001 on circuit board A inputs a V. Sync signal to pin ⑤ and is always in operation. If a V. Sync signal is input to pin ⑤ there will be a waiting period of 2-4 seconds, and the power is shut off.
When entering the service mode, the above function is cancelled and operation is possible.

Adjust the function values as shown below when IC003 on A board is replaced.

KV-13M20 (CND)

No.	Disp.	Data
46	ID-0	9
47	ID-1	1
48	ID-2	0
49	ID-3	0
50	ID-4	17

KV-13M20 (US)

No.	Disp.	Data
46	ID-0	25
47	ID-1	1
48	ID-2	0
49	ID-3	0
50	ID-4	17

KV-13M30/13M31(US)

No.	Disp.	Data
46	ID-0	25
47	ID-1	3
48	ID-2	0
49	ID-3	0
50	ID-4	19

KV-14R20(E)/14RD1/14PM1(MEX)

No.	Disp.	Data
46	ID-0	25
47	ID-1	1
48	ID-2	0
49	ID-3	2
50	ID-42	17

5-2. A BOARD ADJUSTMENTS

RF AGC ADJUSTMENT (IF BLOCK VR)

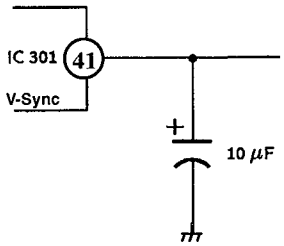
1. Input a color-bar signal.
2. Adjust AGC VR of TU101 so that snow, noise, and cross-modulation disappear from the picture.
3. Verify picture quality on each channel.

H. FREQUENCY ADJUSTMENT

1. Input a monoscope signal.
2. Set to Service adjustment Mode.
3. Connect a frequency counter to base of Q550 (TP-86 H. DRIVE).
4. Select the item of AFC, set to 3 level (free run).
5. Check H. Frequency for the 15734 ± 60 Hz.
6. Select the item of AFC again, adjust the level " 0 ".
7. Write into the memory by pressing [MUTING] then [ENTER] .

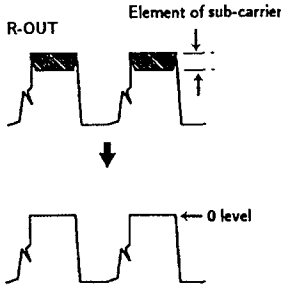
V. FREQUENCY ADJUSTMENT

1. Select video 1 with no signal input.
2. Set the conditions with standard setting.
3. Connect a capacitor (10 µF) across pin (41) of IC301 (V. SYNC) and ground.
4. Connect the frequency counter across CN501 VDY (+) connector and ground.
5. Check V. Frequency for the 59 ± 0.5 Hz
6. Disconnect the capacitor from IC301.



CHROMA TRAP ADJUSTMENT (CROM)

1. Input a red signal.
2. Set to Service adjustment Mode.
3. Connect an oscilloscope CN703 Pin(1) (R OUT) of C board ground.
4. Select CROM with [1] and [4] .
5. Adjust with [3] and [6] for the 0 level.

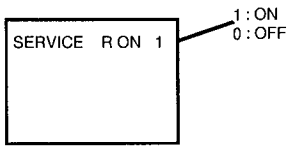


6. Write into the memory by pressing [MUTING] then [ENTER] .

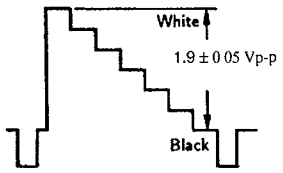
SUB CONTRAST ADJUSTMENT (SCON)

1. Input a color-bar signal.
2. Select the red color.
3. Set to Service adjustment Mode.
4. Set the conditions as follows.

PICTURE	MAX
COLOR	MIN
BRIGHT	CENTER
R ON	ON (1)
G ON	OFF (0)
B ON	OFF (0)



5. Connect an oscilloscope to CN703 Pin(1) (R OUT) of C board and ground.
6. Select SCON with [1] and [4] .
7. Adjust with [3] and [6] for the 1.9 ± 0.05 Vp-p.

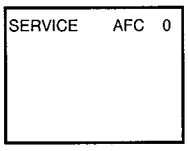


8. Write the memory by pressing [MUTING] then [ENTER] .
9. Return the following back to normal after adjustment.

PICTURE	MAX
COLOR	CENTER
BRIGHT	CENTER
R ON	ON (1)
G ON	ON (1)
B ON	ON (1)

DISPLAY POSITION ADJUSTMENT (DISP)

1. Input a color-bar signal.
2. Set to Service adjustment Mode.
3. Select DISP with [1] and [4] .
4. Adjust with [3] and [6] for the bar center.
5. Write the memory by pressing [MUTING] then [ENTER] .
6. Check if the text is displayed on the screen.

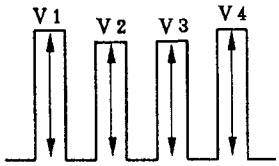


SUB BRIGHT ADJUSTMENT (SBRT)

1. Input a cross-hatch signal.
2. Set to Service adjustment Mode.
3. Set the PICTURE and BRIGHT to minimum.
4. Select SBRT with [1] and [4] .
5. Adjust with [3] and [6] to obtain a faintly visible cross-hatch.
6. Write into the memory by pressing [MUTING] then [ENTER].

SUB HUE, SUB COLOR ADJUSTMENT (SHUE, SCOL)

1. Input a color-bar signal.
2. Set to Service adjustment Mode.
3. Connect an oscilloscope to CN703 Pin ③ (B OUT) of C board.
4. Select SHUE and SCOL with [1] and [4] .
5. Adjust with [3] and [6] for the V1 = V4 (SCOL) and V2 = V3 (SHUE).



6. Write into the memory by pressing [MUTING] then [ENTER] .

V. SIZE ADJUSTMENT (VSIZ)

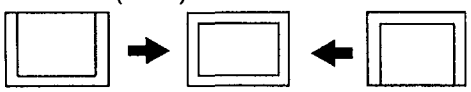
1. Input a cross-hatch signal.
2. Set to Service adjustment Mode.
3. Select VSIZ with [1] and [4] .
4. Adjust with [3] and [6] for the best vertical size.
5. Write into the memory by pressing [MUTING] then [ENTER] .

V. SIZE (VSIZ)

V. CENTER ADJUSTMENT (VPOS)

1. Input a cross-hatch signal.
2. Set to Service adjustment Mode.
3. Select VPOS with [1] and [4] .
4. Adjust with [3] and [6] for the best vertical center.
5. Write into the memory by pressing [MUTING] then [ENTER]

V. CENTER (VPOS)

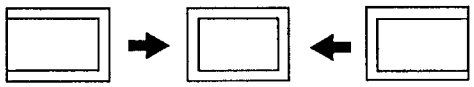


H. CENTER ADJUSTMENT (HPOS)

Note : Perform this adjustment after checking H. FREQUENCY.

1. Input a cross-hatch signal.
2. Set the Service adjustment Mode.
3. Select HPOS with [1] and [4] .
4. Adjust with [3] and [6] for the best horizontal center.
5. Write into the memory by pressing [MUTING] then [ENTER]

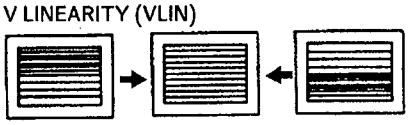
H. CENTER (HPOS)



V LINEARITY (VLIN) AND V CORRECTION (VSCO) ADJUSTMENTS.

1. Input a cross-hatch signal.
2. Set to Service adjustment Mode.
3. Select VLIN and VSCO with [1] and [4] .
4. Adjust with [3] and [6] for the best picture.
5. Write the memory by pressing [MUTING] then [ENTER] .

V LINEARITY (VLIN)



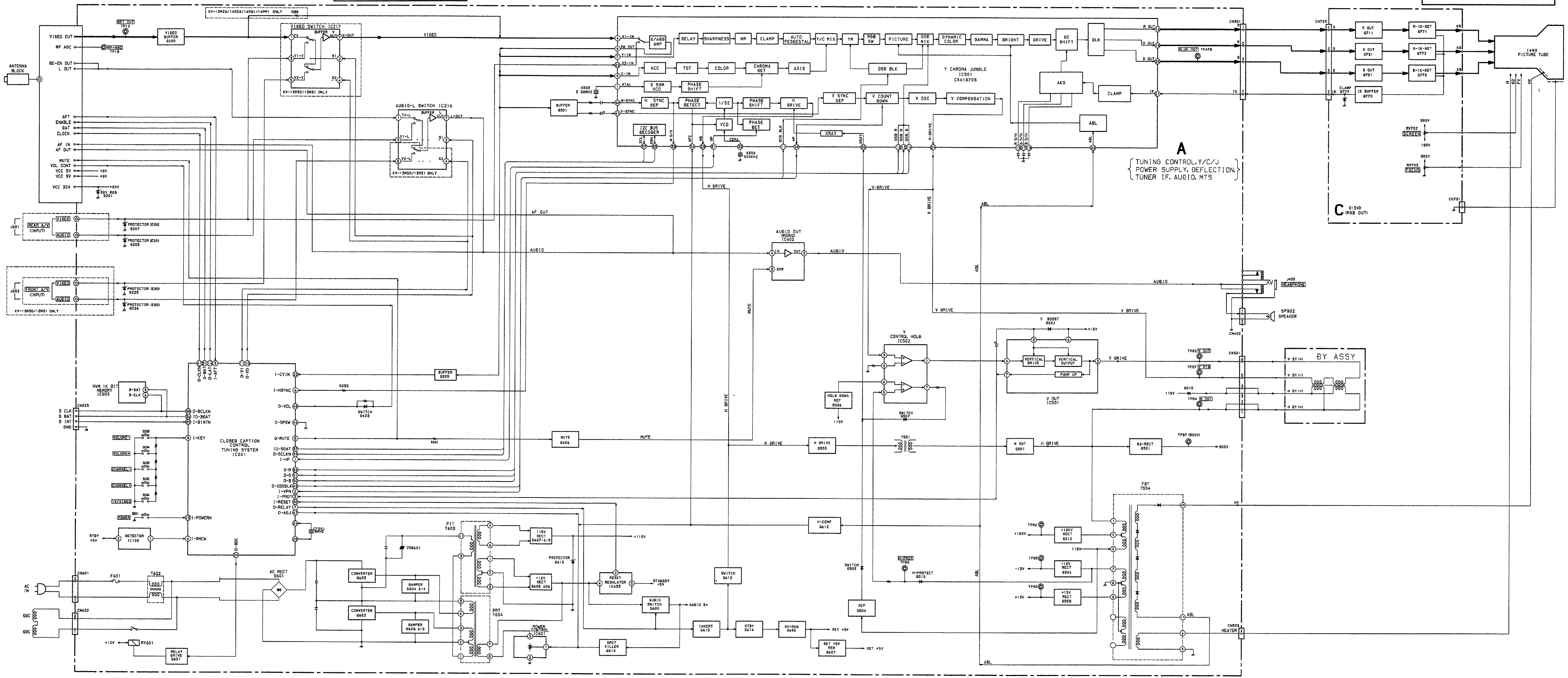
V CORRECTION (VSCO)

6-1. BLOCK DIAGRAMS

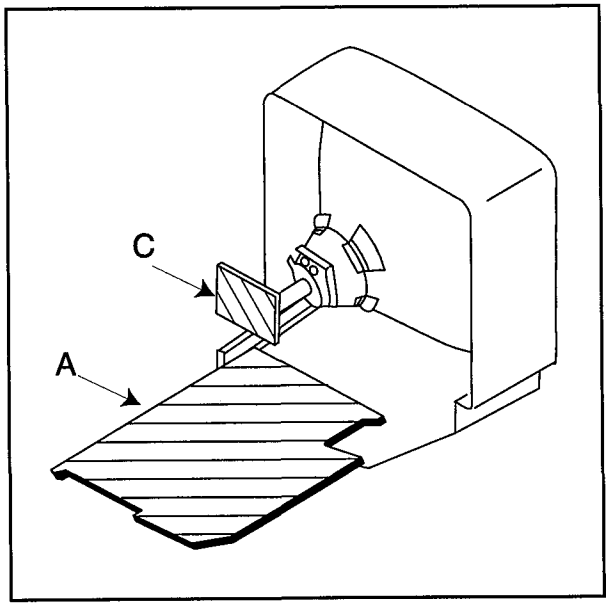
SECTION 6
DIAGRAMS

KV-13M20 / 13M30 / 13M31 / 14R20 / 14RD1 / 14PM1 RM-Y116

KV-13M20 / 13M30 / 13M31 / 14R20 / 14RD1 / 14PM1 RM-Y116



6-2. Circuit Boards Location



6-3. Printed Wiring Boards and Schematic Diagrams

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytic and tantalums.
- All electrolytics are 50V unless otherwise specified
- Indication of resistance, which does not have one for rating electrical power, is as follows:

Pitch: 5mm Rating electrical power 1/4W

- All resistors are in ohms.
  KΩ=1000Ω, MΩ=1000KΩ
- ⊣▭⊢ nonflammable resistor.
- Δ: internal component.
- ▭: panel designation and adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- The components identified by ◪ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.
- When replacing components identified by ◪ make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by ⧓ and repeat the adjustment until the specified value is achieved.
  (Refer to R525 on pages 17 & 18).
- When replacing parts in the table below be sure to perform the related adjustment.

Part replaced (◪)	Adjustment (⧓)
IC301, IC502, IC601, D505, D506, D507, D510, DY, C503, C511, C513, C528, R511,R519, R520, R523, R525, R527, R559, R560, R617, R618, R652, R653, R654,T504 (FBT)	HV HOLD-DOWN (R525)
IC001, IC601, R030, R617, R618, R629, R630, R651,R652, R653, R654, R655, R656	B+ VOLTAGE CONFIRMATION

- All voltages are in V.
- Voltage is dc with respect to ground unless otherwise noted.
- Readings are taken with a 10MΩ digital multimeter.
- Readings are taken with a color-bar signal input.
- Voltage variations may be noted due to normal production tolerance.
- Circled numbers are waveform references.
-  : B + Line
-  : B - Line
- ⇨ : signal path

Reference Information

RESISTOR	: RN	METAL FILM
	: RC	SOLID
	: FPRD	NON FLAMMABLE CARBON
	: FUSE	NON FLAMMABLE FUSIBLE
	: RW	NON FLAMMABLE WIREWOUND
	: RS	NON FLAMMABLE MET AL OXIDE
	: RB	NON FLAMMABLE CEMENT
	: ※	ADJUSTMENT RESISTOR
COIL	: LF-8L	MICRO INDUCTOR
CAPACITOR	: TA	TANTALUM
	: PS	STYROL
	: PP	POLYPROPYLENE
	: PT	MYLAR
	: MPS	METALIZED POLYESTER
	: MPP	METALIZED POLYPROPYLENE
	: ALB	BIPOLAR
	: ALT	HIGH TEMPERATURE
	: ALR	HIGH RIPPLE

Note: The symbol ⊣▭⊢ display is on the component side.

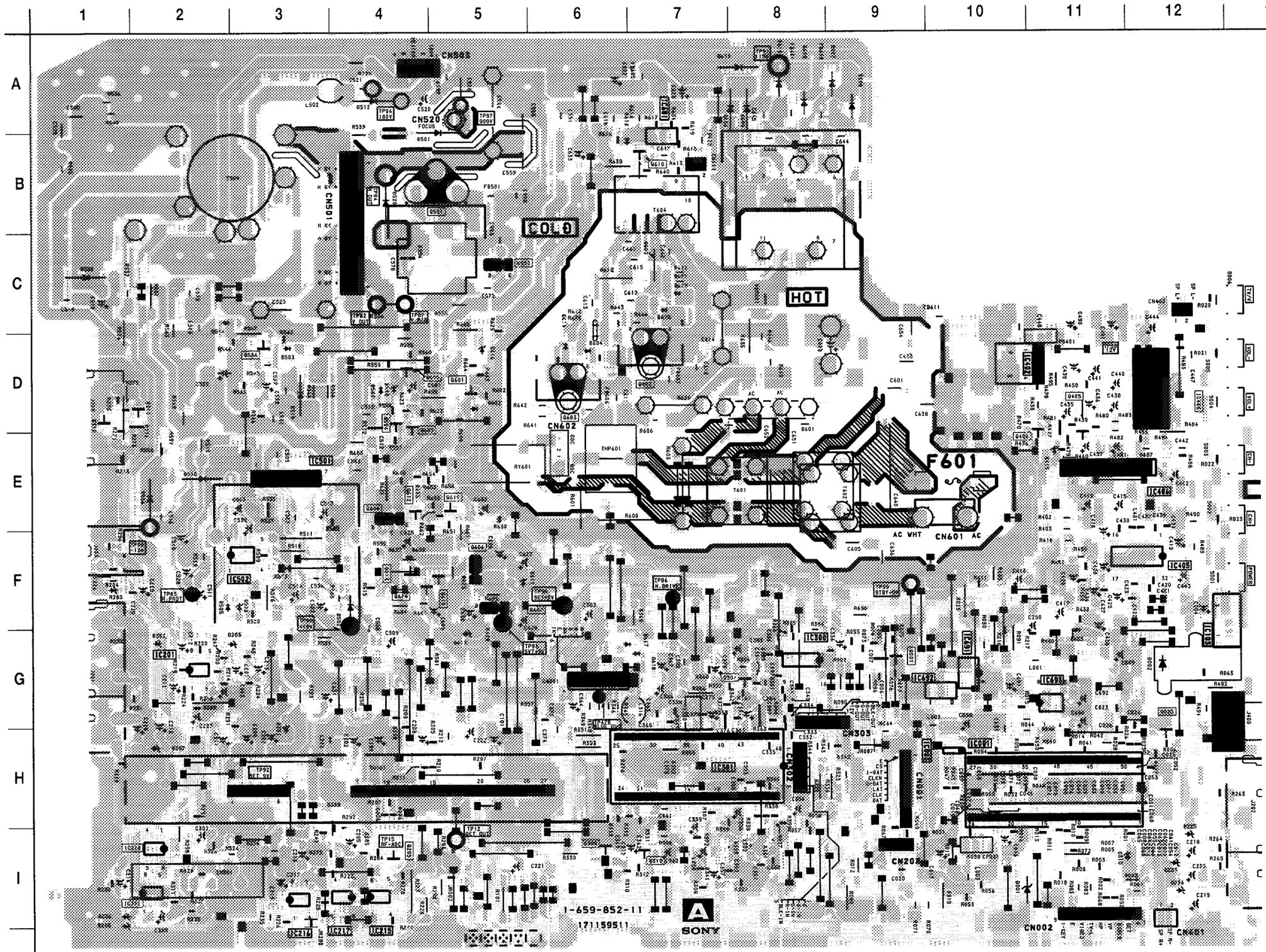
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

The symbol ⊣▭⊢ indicates fast operating fuse. Replace only with fuse of same rating as marked.

A TUNING CONTROL, Y/C/J, POWER SUPPLY, DEFLECTION, TUNER/IF, AUDIO MTS

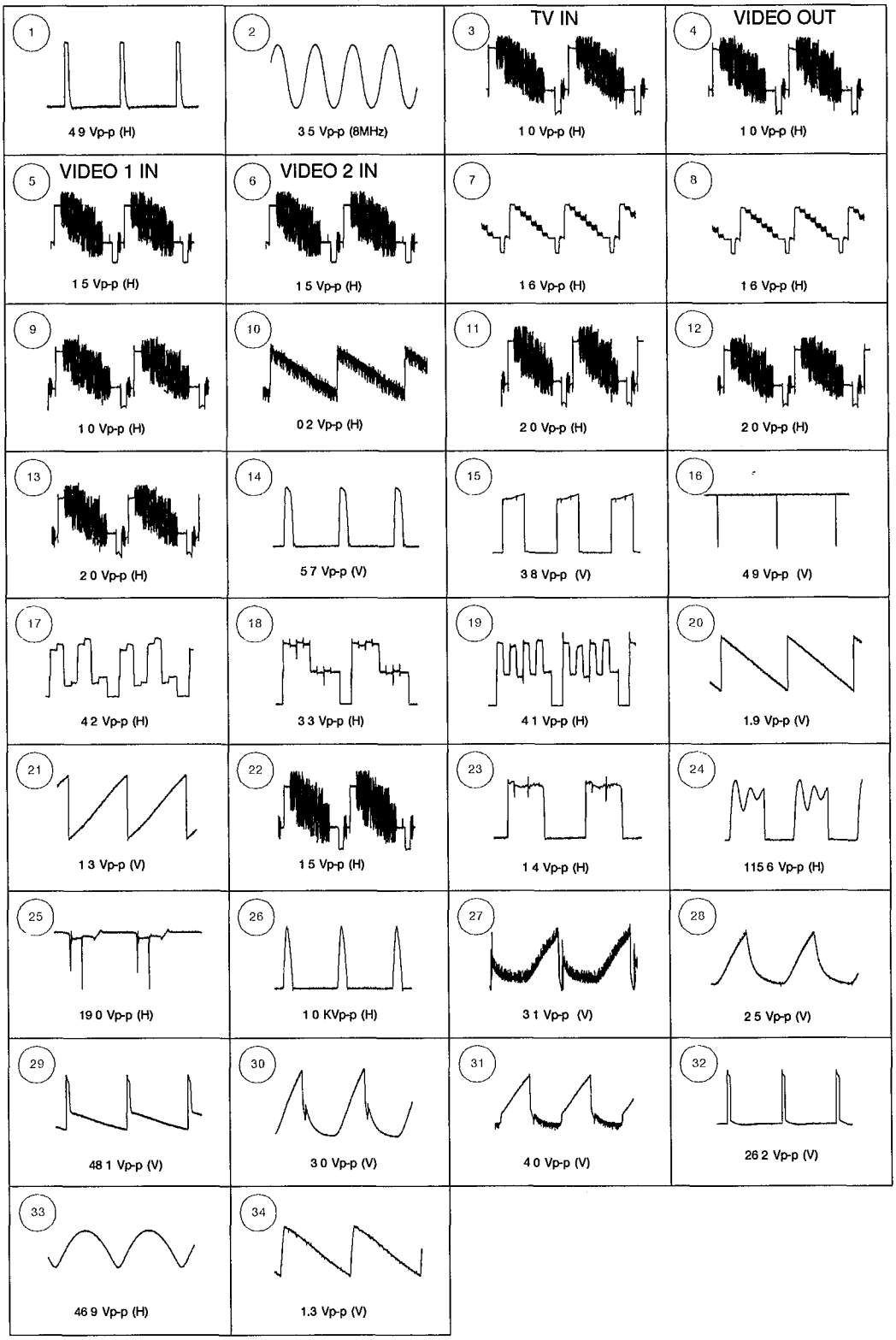
— A BOARD —

NOTE:
The circuit indicated as left contains high voltage of over 600Vp-p. Care must be taken to prevent an electric shock during inspection or repair in these areas.



IC		DIODE	
IC001	H - 10	D001	I - 10
IC003	H - 9	D201	H - 3
IC103	G - 12	D203	G - 3
IC201	G - 2	D205	I - 1
IC215	J - 4	D206	I - 1
IC216	J - 3	D207	H - 2
IC217	J - 4	D225	I - 12
IC301	H - 7	D226	I - 12
IC402	D - 10	D227	I - 12
IC406	E - 12	D310	I - 11
IC408	D - 12	D403	G - 11
IC501	E - 3	D415	E - 11
IC502	F - 3	D501	B - 4
IC601	A - 7	D502	F - 4
IC693	G - 11	D503	D - 3
TRANSISTOR		D504	E - 2
Q205	I - 4	D505	F - 2
Q210	D - 1	D506	F - 3
Q211	D - 2	D507	D - 4
Q301	G - 8	D509	C - 1
Q305	I - 6	D510	E - 2
Q405	D - 11	D512	A - 4
Q406	E - 10	D514	C - 2
Q504	D - 3	D515	D - 3
Q550	C - 5	D601	D - 8
Q551	B - 5	D602	D - 5
Q601	D - 5	D603	C - 7
Q602	D - 7	D604	D - 6
Q603	D - 6	D605	A - 8
Q605	D - 4	D606	A - 7
Q606	F - 5	D607	A - 9
Q607	F - 6	D608	A - 9
Q610	B - 7	D609	A - 8
Q612	E - 4	D610	A - 8
Q613	F - 4	D611	F - 5
Q614	F - 4	D612	G - 5
Q615	F - 5	D613	A - 8
		D614	C - 6
		D615	C - 7
		D619	A - 6

. A BOARD WAVEFORMS

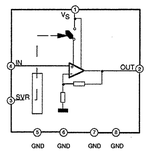


Ref. No.	Location	KV-13M20 / 14R20/ 14RD1/ 14PM1	KV-13M30/13M31
C216	B-8	0.47	10
C218	B-6	-	10
C219	B-7	-	1
C357	G-10	JW (5)	0.22
D225	B-7	-	MTZJT-10B
D226	B-7	-	MTZJT-10B
IC216	C-7	NJM2233	NJM2234
IC217	B-6	-	NJM2234
J202	A-6	-	2P
JW405	C-15	SMM	SMM
PS401	B-15	JW (5)	JW (5)
R072	F-4	-	220
R222	C-5	-	10K
R225	B-6	-	0
R226	B-7	-	0
R243	B-7	-	0
R263	B-6	-	75
R264	B-6	-	470K
R289	C-6	JW (7.5)	-
R290	B-6	-	100
R292	B-7	0	-

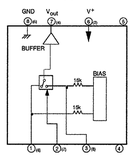
A BOARD * MARK TABLE

0: TO BE MOUNTED
-: NO MOUNT

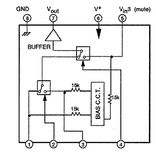
A BOARD IC402 TDA7267



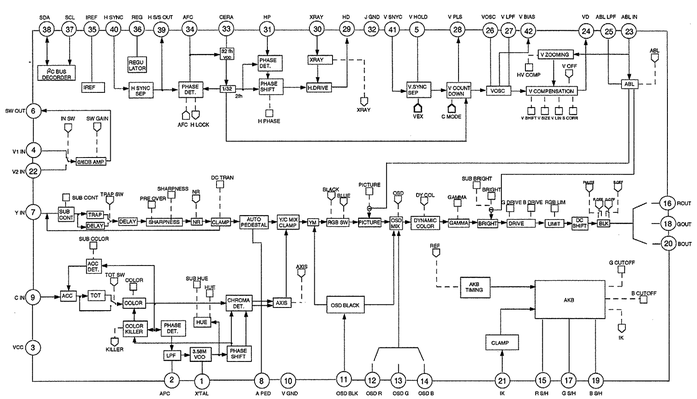
A BOARD IC216 NJM2233BM



A BOARD IC216, 217 NJM 2234BM

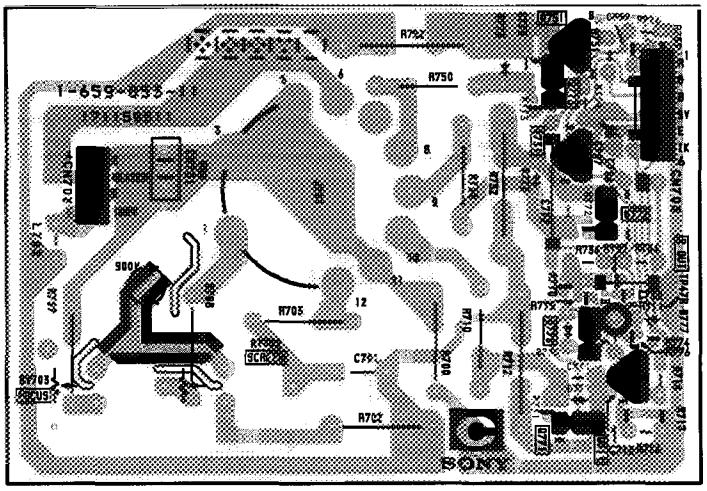


A BOARD IC301 CXA1870S

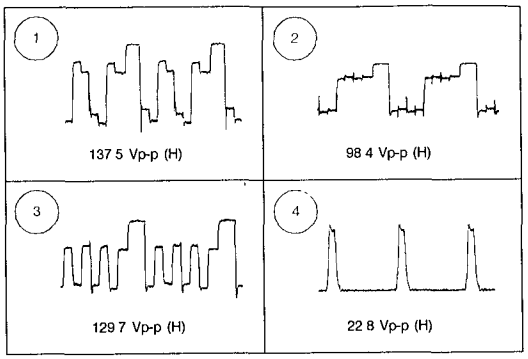


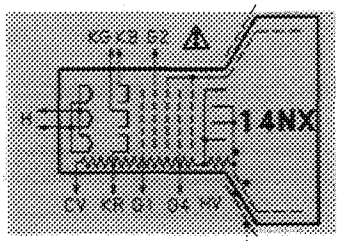
Schematic diagrams

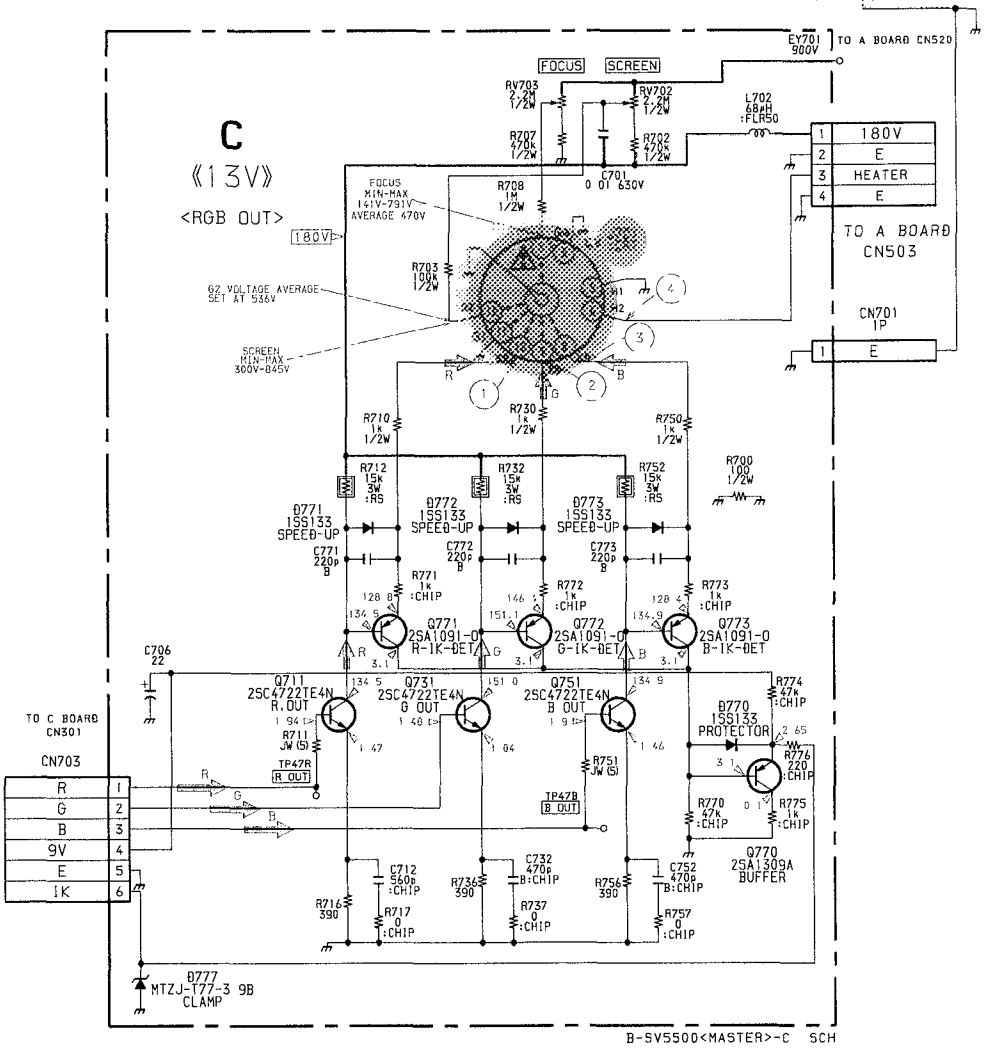
C board →



. C BOARD WAVEFORMS





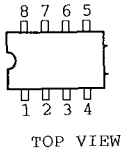


Schematic diagrams

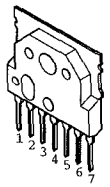
← A board

6-4. SEMICONDUCTORS

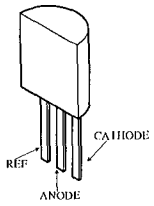
TDA7267



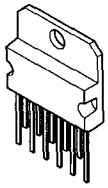
LA7830



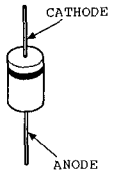
uPC1093J-1-T



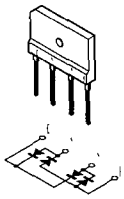
TDA2009A



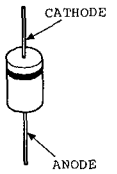
1SS119-25TD
1SS133T-77
MTZJ-T-77-10B
MTZJ-T-77-2 2
MTZJ-T-77-3.3B
MTZJ-T-77-30D
MTZJ-T-77-5 1C
MTZJ-T-77-5.6C
MTZJ-T-77-8.2B



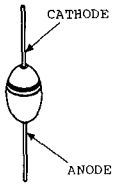
D3SB60F



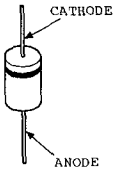
D1NL20-TA
EL1Z-V1
RGP10GPKG3



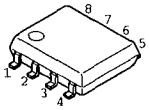
GP08DPKG3



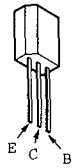
D2S4MTA1



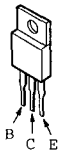
NJM2233BM(TE2)
NJM2234(TE2)
NJM4558M-TE2



2SD2137-OP-TA



2SD1877S-SONY-CA



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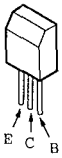
2SD1292



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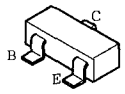
2SB709A-QRS-TX
2SD601A-QRS-TX



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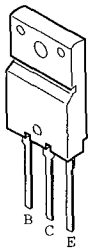
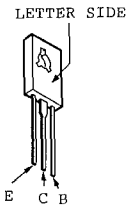
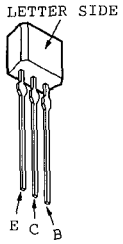


2SA1091-0

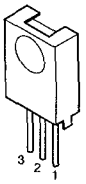
2SC2611



2SA1175-HFE



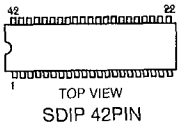
SBX1790-51



M37267M6 - 059SP

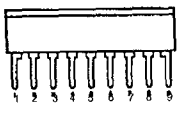
DIP 52PIN

CXA1870S



SDIP 42PIN

uPC1406HA



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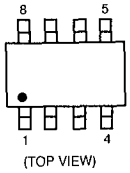
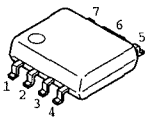


MM1319



SECTION 7
EXPLODED VIEWS

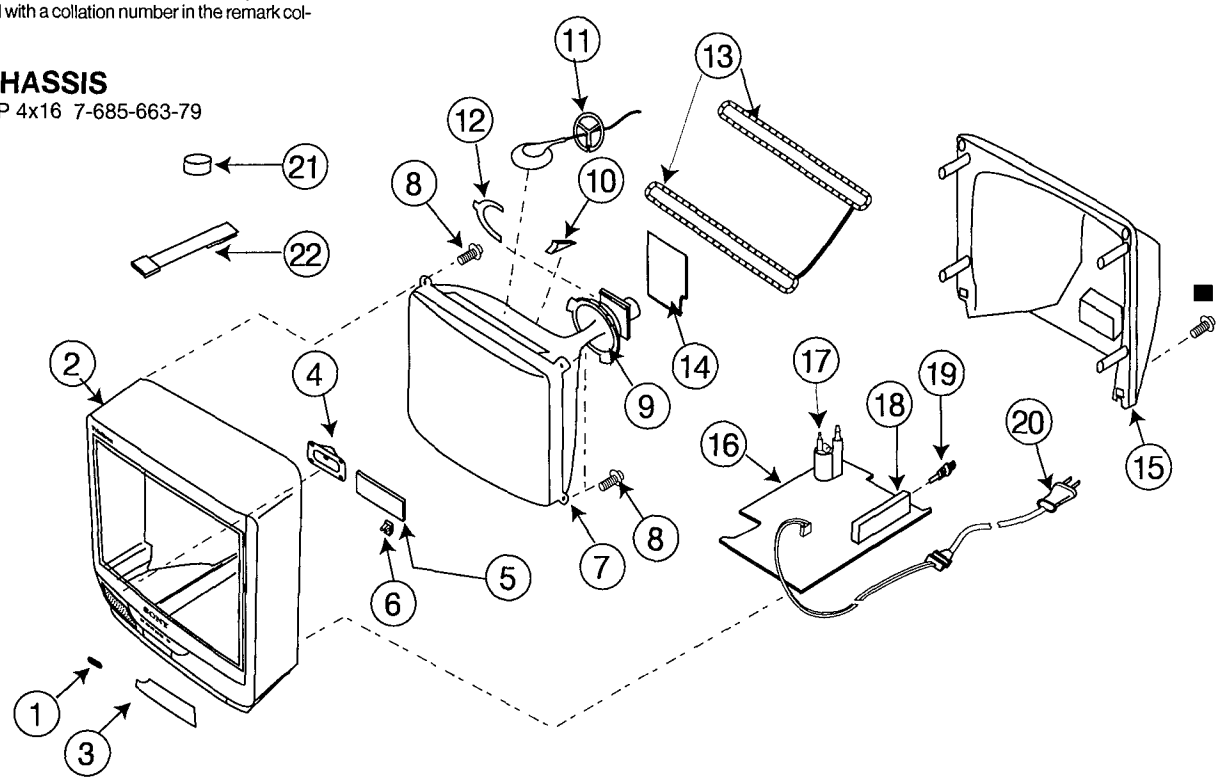
NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service
- The construction parts of an assembled parts are indicated with a collation number in the remark column

- Items marked " * " are not stocked since they are *seldom required for routine service Some delay* should be anticipated when ordering these items

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

7-1. CHASSIS

■ BVTP 4x16 7-685-663-79



REF.NO.		PART NO.	DESCRIPTION	REMARK
1		4-046-162-01	EMBLEM (NO 6) SONY	
2		4-051-571-01	BEZNET	(KV-13M30)
		4-051-571-11	BEZNET	(KV-13M31)
		4-051-571-21	BEZNET	(KV-13M20/14PM1)
		4-051-571-31	BEZNET	(KV-14R20)
		4-051-571-41	BEZNET	(KV-14RD1)
3		4-051-569-01	DOOR,CONTROL (KV-13M30/13M20/14R20/14RD1/14PM1)	
		4-051-569-11	DOOR, CONTROL	(KV-13M31)
4		1-505-265-11	SPEAKER (9X5CM)	
5		4-051-567-01	BUTTON, MULTI (KV-13M30/13M20/14R20/14RD1/14PM1)	
		4-051-567-11	BUTTON, MULTI	(KV-13M31)
6		4-051-568-01	FILTER, REMOTE	
7	⚠	8-735-562-63	CR2 14ND※	
8		4-365-808-01	SCREW (5), TAPPING	
9	⚠	8-451-418-21	DY Y14ND※	
10		4-053-005-01	SPACER, DY	
11		3-704-372-31	HOLDER, HV CABLE	
12		1-452-277-00	MAGNET, BMC	
13	⚠	1-426-148-21	COIL, DEMAGNETIZATIC※	
14	*	A-1331-519-A	MOUNTED PCB, C	
15		4-051-570-01	REAR COVER (KV-13M30/13M20/14R20/14RD1/14PM1)	
		4-051-570-11	REAR COVER	(KV-13M31)

REF.NO.		PART NO.	DESCRIPTION	REMARK
16	*	A-1297-785-A	COMPLETE (PCB,A) (KV-13M20/14R20/14RD14PM1)	
	*	A-1297-714-A	COMPLETE (PCB,A)	(KV-13M30/13M31)
17	⚠	1-453-210-11	TRANSFORMER ASSY, FLYBACK(NX1731)	
18	⚠	8-598-339-00	TUNER BTF-LA402	
19		1-766-374-11	PLUG, F PIN	
20	⚠	1-751-053-11	CORD, POWER (WITH CONNECTOR) 10A/125V	(KV-13M30/13M20/14R20/14RD1/14PM1)
	⚠	1-751-058-11	CORD, POWER (WITH CONNECTOR) 10A/125V	(KV-13M31)
21		1-452-032-00	MAGNET, DISC	
22		X-4308-815-0	PERMALLOY ASSY, CONVERGENCE	

A

SECTION 8
ELECTRICAL PARTS LIST

Note:

The components identified by shading and mark ⚠ are critical for safety
Replace only with part number specified

- Items marked " * " are not stocked since they are seldom required for routine service Some delay should be anticipated when ordering these items
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted

RESISTORS

- All resistors are in ohms
- F : nonflammabe

When indicating parts by reference number, please include the board name.

CAPACITORS MF : μF, PF . μμF

COILS MMH : mH, uH . μH

- The components identified by ⧓ in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation Should replacement be required, replace only with the value originally used

REF.NO.	PART NO.	DESCRIPTION			REMARK
*	A-1297-714-A	A BOARD COMPLETE (KV-13M30/13M31)			
*	A-1297-785-A	A BOARD COMPLETE (KV-13M20/14R20/14RD1/14PM1)			
		**********			
	1-533-223-11	HOLDER, FUSE			
*	1-900-800-66	CONNECTOR ASSY, 4P MINI MICRO			
*	1-900-800-67	CONNECTOR ASSY, 6P MINI MICRO			
	4-382-854-11	SCREW (M3X10), P, SW (+)			
	7-682-949-01	SCREW + PSW 3X10			
		<CAPACITOR>			
C001	1-163-125-00	CERAMIC CHIP	220pF	5%	50V
C008	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V
C010	1-163-009-11	CERAMIC CHIP	0 001MF	10%	50V
C014	1-164-004-11	CERAMIC CHIP	0 1MF	10%	25V
C017	1-124-903-11	ELECT	1MF	20%	50V
C019	1-163-135-00	CERAMIC CHIP	560pF	5%	50V
C020	1-137-399-11	FILM	0 1MF	5%	50V
C023	1-163-125-00	CERAMIC CHIP	220pF	5%	50V
C024	1-163-125-00	CERAMIC CHIP	220pF	5%	50V
C025	1-163-125-00	CERAMIC CHIP	220pF	5%	50V
C026	1-163-243-11	CERAMIC CHIP	47pF	5%	50V
C028	1-163-005-11	CERAMIC CHIP	470pF	10%	50V
C030	1-163-125-00	CERAMIC CHIP	220pF	5%	50V
C034	1-163-037-11	CERAMIC CHIP	0 022MF	10%	50V
C037	1-164-161-11	CERAMIC CHIP	0 0022MF	10%	50V
C038	1-126-941-11	ELECT	470MF	20%	25V
C046	1-104-664-11	ELECT	47MF	20%	25V
C047	1-163-125-00	CERAMIC CHIP	220pF	5%	50V
C048	1-163-009-11	CERAMIC CHIP	0 001MF	10%	50V
C050	1-163-251-11	CERAMIC CHIP	100pF	5%	50V
C051	1-163-251-11	CERAMIC CHIP	100pF	5%	50V
C052	1-163-251-11	CERAMIC CHIP	100pF	5%	50V
C053	1-163-251-11	CERAMIC CHIP	100pF	5%	50V
C060	1-163-227-11	CERAMIC CHIP	10pF	0 5pF	50V
C101	1-126-963-11	ELECT	4.7MF	20%	50V
C202	1-126-964-11	ELECT	10MF	20%	50V
C204	1-104-665-11	ELECT	100MF	20%	25V
C205	1-124-902-00	ELECT	0 47MF	20%	50V
C206	1-163-017-00	CERAMIC CHIP	0 0047MF	10%	50V
C208	1-124-903-11	ELECT	1MF	20%	50V

REF.NO.	PART NO.	DESCRIPTION			REMARK
C215	1-126-964-11	ELECT	10MF	20%	50V
C216	1-124-902-00	ELECT (KV-13M20/14R20/14RD1/14PM1)	0.47MF	20%	50V
C216	1-126-964-11	ELECT (KV-13M30/13M31)	10MF	20%	50V
C218	1-126-964-11	ELECT (KV-13M30/13M31)	10MF	20%	50V
C219	1-124-903-11	ELECT (KV-13M30/13M31)	1MF	20%	50V
C222	1-124-903-11	ELECT	1MF	20%	50V
C229	1-124-903-11	ELECT	1MF	20%	50V
C301	1-163-251-11	CERAMIC CHIP	100pF	5%	50V
C315	1-104-664-11	ELECT	47MF	20%	25V
C330	1-163-007-11	CERAMIC CHIP	680pF	10%	50V
C352	1-163-229-11	CERAMIC CHIP	12pF	5%	50V
C353	1-163-005-11	CERAMIC CHIP	470pF	10%	50V
C354	1-124-902-00	ELECT	0 47MF	20%	50V
C355	1-164-232-11	CERAMIC CHIP	0 01MF	10%	50V
C356	1-126-934-11	ELECT	220MF	20%	16V
C357	1-124-464-11	ELECT (KV-13M30/13M31)	0.22MF	20%	50V
C358	1-124-902-00	ELECT	0 47MF	20%	50V
C359	1-124-902-00	ELECT	0 47MF	20%	50V
C360	1-126-963-11	ELECT	4.7MF	20%	50V
C361	1-137-399-11	FILM	0 1MF	5%	50V
C362	1-137-399-11	FILM	0.1MF	5%	50V
C363	1-137-399-11	FILM	0.1MF	5%	50V
C364	1-124-902-00	ELECT	0 47MF	20%	50V
C366	1-124-903-11	ELECT	1MF	20%	50V
C367	1-126-963-11	ELECT	4.7MF	20%	50V
C368	1-136-169-00	FILM	0.22MF	5%	50V
C369	1-163-037-11	CERAMIC CHIP	0.022MF	10%	50V
C373	1-137-370-11	FILM	0.01MF	5%	50V
C374	1-163-125-00	CERAMIC CHIP	220pF	5%	50V
C375	1-126-963-11	ELECT	4 7MF	20%	50V
C376	1-164-232-11	CERAMIC CHIP	0.01MF	10%	50V
C378	1-124-925-11	ELECT	2.2MF	20%	50V
C379	1-163-017-00	CERAMIC CHIP	4700PF	10%	50V
C381	1-124-903-11	ELECT	1MF	20%	50V

The components identified by shading and mark ⚠ are critical for safety
Replace only with part number specified

A

REF.NO.	PART NO.	DESCRIPTION				REMARK
C382	1-104-665-11	ELECT	100MF	20%	25V	
C383	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	
C390	1-137-399-11	FILM	0.1MF	5%	50V	
C408	1-124-902-00	ELECT	0.47MF	20%	50V	
C436	1-126-956-91	ELECT	0 1MF	20%	50V	
C439	1-126-965-11	ELECT	22MF	20%	50V	
C444	1-126-941-11	ELECT	470MF	20%	25V	
C448	1-136-173-00	FILM	0 47MF	5%	50V	
C490	1-126-941-11	ELECT	470MF	20%	25V	
C491	1-126-941-11	ELECT	470MF	20%	25V	
C502	1-126-965-11	ELECT	22MF	20%	50V	
C503	1-107-698-11	ELECT	10MF	20%	25V	
C504	1-130-489-00	FILM	0 033MF	5%	50V	
C505	1-102-963-00	CERAMIC	33pF	5%	50V	
C507	1-102-038-00	CERAMIC	0.001MF		500V	
C508	1-102-038-00	CERAMIC	0.001MF		500V	
C509	1-126-968-11	ELECT	100MF	20%	50V	
C510	1-108-702-11	MYLAR	0.068MF	10%	100V	
C511 ⚠	1-126-963-11	ELECT	4.7MF	20%	50V	
C512	1-163-031-11	CERAMIC	0.01MF		50V	
C513	1-126-964-11	ELECT	10MF	20%	50V	
C514	1-104-664-11	ELECT	47MF	20%	25V	
C515	1-126-941-11	ELECT	470MF	20%	25V	
C516	1-102-244-00	CERAMIC	220pF	10%	500V	
C517	1-126-941-11	ELECT	470MF	20%	25V	
C518	1-126-941-11	ELECT	470MF	20%	25V	
C519	1-102-244-00	CERAMIC	220pF	10%	500V	
C520	1-107-652-11	ELECT	10MF	20%	250V	
C521	1-102-244-00	CERAMIC	220pF	10%	500V	
C522	1-123-024-21	ELECT	33MF		160V	
C523	1-136-108-00	FILM	0 43MF	5%	200V	
C525	1-106-387-00	MYLAR	0.068MF	10%	200V	
C526	1-162-114-00	CERAMIC	4700PF		2 00KV	
C527	1-126-965-11	ELECT	22MF	20%	50V	
C528 ⚠	1-107-638-11	ELECT	4.7MF	20%	160V	
C530	1-104-664-11	ELECT	47MF	20%	25V	
C553	1-102-228-00	CERAMIC	470pF	10%	500V	
C554 ⚠	1-164-773-11	FILM	6800PF	5%	2.0KV	
C558	1-106-371-00	MYLAR	0.015MF	10%	100V	
C559 ⚠	1-162-115-00	CERAMIC	330PF	10%	2KV	
C575	1-106-371-00	MYLAR	0 015MF		200V	
C579 ⚠	1-106-371-00	MYLAR	0.015MF	10%	100V	
C601 ⚠	1-133-920-11	ELECT	0.0022MF	20%	250V	
C605 ⚠	1-133-920-11	ELECT	0.0022MF	20%	250V	
C609	1-104-759-11	ELECT	470MF	20%	200V	
C610	1-164-625-11	CERAMIC	680PF	10%	500V	
C611	1-164-625-11	CERAMIC	680PF	10%	500V	
C612	1-136-171-00	FILM	0.33MF	5%	50V	
C613	1-136-171-00	FILM	0 33MF	5%	50V	
C614	1-136-759-11	FILM	0.039MF	5%	630V	
C615	1-164-735-11	CERAMIC	1500PF	10%	500V	
C617	1-137-367-11	FILM	0.0033MF	5%	50V	
C619	1-106-355-12	MYLAR	0 0033MF	10%	200V	
C622	1-126-942-61	ELECT	1000MF	20%	25V	
C623	1-123-024-21	ELECT	33MF		160V	
C625	1-104-665-11	ELECT	100MF	20%	25V	
C628	1-104-664-11	ELECT	47MF	20%	25V	
C631	1-104-664-11	ELECT	47MF	20%	25V	
C632	1-124-902-00	ELECT	0 47MF	20%	50V	
C636 ⚠	1-133-920-11	ELECT	0.0022MF	20%	250V	
C638 ⚠	1-133-938-11	ELECT	0.0022MF	20%	250V	
C640 ⚠	1-136-311-11	FILM	0.47MF	20%	125V	
C641	1-136-167-00	FILM	0 15MF	5%	50V	
C642	1-136-167-00	FILM	0.15MF	5%	50V	
C643	1-165-127-11	CERAMIC	470pF	10%	500V	
C644	1-165-127-11	CERAMIC	470pF	10%	500V	
C645	1-165-127-11	CERAMIC	470pF	10%	500V	
C646	1-165-127-11	CERAMIC	470pF	10%	500V	
C653	1-113-910-11	CERAMIC	470PF	10%	250V	
C685	1-124-903-11	ELECT	1MF	20%	50V	
C690	1-124-902-00	ELECT	0 47MF	20%	50V	
C691	1-126-941-11	ELECT	470MF	20%	25V	
C692	1-104-664-11	ELECT	47MF	20%	25V	
C693	1-136-173-00	FILM	0 47MF	5%	50V	
		<FILTER>				
CF001	1-579-952-21	VIBRATOR, CERAMIC				
		<CONNECTOR>				
CN203 *	1-560-124-00	PLUG, CONNECTOR (2 5MM) 4P				
CN402	1-564-505-11	PLUG, CONNECTOR 2P				
CN501 *	1-580-798-11	CONNECTOR PIN (DY) 6P				
CN601 *	1-580-843-11	PIN, CONNECTOR (POWER)				
CN602 *	1-508-786-00	PIN, CONNECTOR (5MM PITCH) 2P				
		<DIODE>				
D001	8-719-921-44	DIODE MTZJ-5.1C				
D201	8-719-982-22	DIODE MTZJ-30D				
D205	8-719-110-17	DIODE RD10ESB2				
D207	8-719-110-17	DIODE RD10ESB2				
D225	8-719-110-17	DIODE RD10ESB2				(KV-13M30/13M31)
D226	8-719-110-17	DIODE RD10ESB2				(KV-13M30/13M31)
D310	8-719-921-44	DIODE MTZJ-5.1C				
D403	8-719-991-33	DIODE 1SS133T-77				
D415	8-719-982-96	DIODE MTZJ-T-77-2.2A				
D501	8-719-028-72	DIODE RGP02-17EL-6433				
D502	8-719-908-03	DIODE GP08D				
D503	8-719-991-33	DIODE 1SS133T-77				
D504	8-719-302-43	DIODE EL1Z				
D505	8-719-991-33	DIODE 1SS133T-77				
D506	8-719-110-08	DIODE RD8 2ES-B2				
D507	8-719-991-33	DIODE 1SS133T-77				
D509	8-719-302-43	DIODE EL1Z				
D511 ⚠	8-719-302-43	DIODE EL2Z				
D512	8-719-302-43	DIODE EL1Z				
D514	8-719-991-33	DIODE 1SS133T-77				
D515	8-719-302-43	DIODE EL1Z				

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REF.NO.	PART NO.	DESCRIPTION	REMARK
D601 ⚠	8-719-510-51	DIODE D3SB60P	
D602	8-719-991-33	DIODE 1SS133T-77	
D603	8-719-911-19	DIODE 1SS119-25	
D604	8-719-911-19	DIODE 1SS119-25	
D605	8-719-022-97	DIODE D2S4MF	
D606	8-719-022-97	DIODE D2S4MF	
D607	8-719-510-26	DIODE D1NL20	
D608	8-719-510-26	DIODE D1NL20	
D609	8-719-510-26	DIODE D1NL20	
D610	8-719-510-26	DIODE D1NL20	
D611	8-719-110-17	DIODE RD10ESB2	
D612	8-719-109-89	DIODE RD5.6ESB2	
D613	8-719-057-53	DIODE EZ0150V1	
D614	8-719-911-19	DIODE 1SS119-25	
D615	8-719-911-19	DIODE 1SS119-25	
	<FUSE>		
F601 ⚠	1-576-193-11	FUSE 6.3A / 125V	
	<FERRITE BEAD>		
FB501	1-410-396-41	FERRITE BEAD INDUCTOR 0.45UH	
FB601	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB602	1-412-911-11	INDUCTOR, FERRITE BEAD	
FB605	1-410-396-41	FERRITE BEAD INDUCTOR 0 45UH	
FB606	1-410-396-41	FERRITE BEAD INDUCTOR 0.45UH	
FB607	1-410-396-41	FERRITE BEAD INDUCTOR 0.45UH	
FB611	1-412-911-11	INDUCTOR, FERRITE BEAD	
	<IC>		
IC001	8-759-390-31	IC M37267M6-059SP	
IC003	8-759-354-27	IC ST24C01FM6TR	
IC103	8-747-905-11	IC SBX1790-51	
IC216	8-759-710-07	IC NJM2234M	(KV-13M30/13M31)
IC216	8-759-710-86	IC NJM2233BM (KV-13M20/14R20/14RD1/14PM1)	
IC217	8-759-710-07	IC NJM2234M	(KV-13M30/13M31)
IC301	8-752-070-52	IC CXA1870S	
IC402	8-759-365-39	IC TDA7267	
IC501	8-759-801-98	IC LA7830	
IC502	8-759-100-96	IC uPC4558G2	
IC661 ⚠	8-759-198-33	IC uPC1093J-1-A	
IC693	8-759-371-21	IC MM1319AFBE	
	<JACK>		
J201	1-580-441-31	JACK, PIN 2P	
J202	1-580-441-41	JACK, PIN 2P	(KV-13M30/13M31)
J400	1-568-267-21	JACK	
	<CHIP CONDUCTOR>		
JR002	1-216-295-91	CONDUCTOR, CHIP	(2012)
JR007	1-216-295-91	CONDUCTOR, CHIP	(2012)
JR290	1-216-295-91	CONDUCTOR, CHIP	(2012)
	<COIL>		
L001	1-410-470-11	INDUCTOR 10UH	

REF.NO.	PART NO.	DESCRIPTION	REMARK
L002	1-408-421-00	INDUCTOR 100UH	
L003	1-408-421-00	INDUCTOR 100UH	
L202	1-410-470-11	INDUCTOR 10UH	
L316	1-410-671-31	INDUCTOR 47UH	
L501	1-412-553-11	INDUCTOR 3.3MMH	
L502	1-410-669-31	INDUCTOR 33UH	
L503 ⚠	1-412-531-31	INDUCTOR 33UH	
L551	1-412-533-21	INDUCTOR 47UH	
	<TRANSISTOR>		
Q205	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q301	8-729-216-22	TRANSISTOR 2SA1162-G	
Q305	8-729-216-22	TRANSISTOR 2SA1162-G	
Q406	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q504	8-729-105-08	TRANSISTOR 2SA1330-06	
Q550	8-729-140-96	TRANSISTOR 2SD774-34	
Q551	8-729-810-49	TRANSISTOR 2SD1877S-SONY-CA	
Q601	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q602	8-729-035-37	TRANSISTOR 2SC5271-ROYG-F	
Q603	8-729-035-37	TRANSISTOR 2SC5271-ROYG-F	
Q606	8-729-423-99	TRANSISTOR 2SD2137-OP	
Q607	8-729-111-55	TRANSISTOR 2SD1312-K	
Q612	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q613	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q614	8-729-422-27	TRANSISTOR 2SD601A-Q	
Q615	8-729-422-27	TRANSISTOR 2SD601A-Q	
	<RESISTOR>		
R001	1-216-065-00	METAL GLAZE 4 7K 5% 1/10W	
R002	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R003	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R005	1-249-429-11	CARBON 10K 5% 1/4W	
R007	1-249-421-11	CARBON 2.2K 5% 1/4W	
R008	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R009	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R012	1-247-815-91	CARBON 220 5% 1/4W	
R013	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R014	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R015	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R016	1-216-041-00	METAL GLAZE 470 5% 1/10W	
R017	1-216-113-00	METAL GLAZE 470K 5% 1/10W	
R018	1-216-049-91	METAL GLAZE 1K 5% 1/10W	
R019	1-249-425-11	CARBON 4.7K 5% 1/4W	
R020	1-216-069-00	METAL GLAZE 6 8K 5% 1/10W	
R021	1-216-045-00	METAL GLAZE 680 5% 1/10W	
R022	1-216-047-91	METAL GLAZE 820 5% 1/10W	
R023	1-216-057-00	METAL GLAZE 2 2K 5% 1/10W	
R025	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R026	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R027	1-216-033-00	METAL GLAZE 220 5% 1/10W	
R028	1-216-041-00	METAL GLAZE 470 5% 1/10W	
R029	1-249-431-11	CARBON 15K 5% 1/4W	
R030	1-249-429-11	CARBON 10K 5% 1/4W	
R031	1-216-045-00	METAL GLAZE 680 5% 1/10W	

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REF.NO.	PART NO.	DESCRIPTION			REMARK
R032	1-216-033-00	METAL GLAZE	220	5%	1/10W
R033	1-216-033-00	METAL GLAZE	220	5%	1/10W
R038	1-216-049-91	METAL GLAZE	1K	5%	1/10W
R039	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R042	1-249-425-11	CARBON	4 7K	5%	1/4W
R043	1-249-417-11	CARBON	1K	5%	1/4W
R044	1-247-815-91	CARBON	220	5%	1/4W
R045	1-216-065-00	METAL GLAZE	4 7K	5%	1/10W
R046	1-247-815-91	CARBON	220	5%	1/4W
R047	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R048	1-216-025-91	METAL GLAZE	100	5%	1/10W
R049	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R050	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R054	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R055	1-216-033-00	METAL GLAZE	220	5%	1/10W
R056	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R057	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R058	1-216-065-00	METAL GLAZE	4 7K	5%	1/10W
R072	1-216-033-00	METAL GLAZE (KV-13M30/13M31)	220	5%	1/10W
R101	1-249-429-11	CARBON	10K	5%	1/4W
R203	1-215-899-11	METAL OXIDE	15K	5%	2W F
R206	1-216-689-11	METAL GLAZE	39K	5%	1/10W
R207	1-216-083-00	METAL GLAZE	27K	5%	1/10W
R208	1-216-065-00	METAL GLAZE	4 7K	5%	1/10W
R209	1-216-069-00	METAL GLAZE	6 8K	5%	1/10W
R210	1-216-033-00	METAL GLAZE	220	5%	1/10W
R211	1-216-049-91	METAL GLAZE	1 0K	5%	1/10W
R212	1-249-425-11	CARBON	4 7K	5%	1/4W
R222	1-216-073-00	METAL GLAZE (KV-13M30/13M31)	10K	5%	1/10W
R223	1-247-807-31	CARBON	100	5%	1/4W
R225	1-216-295-91	CONDUCTOR, CHIP (KV-13M30/13M31)		(2012)	
R226	1-216-295-91	CONDUCTOR, CHIP (KV-13M30/13M31)		(2012)	
R231	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R232	1-216-022-00	METAL GLAZE	75	5%	1/10W
R243	1-216-295-91	CONDUCTOR, CHIP (KV-13M30/13M31)		(2012)	
R263	1-216-022-00	METAL GLAZE (KV-13M30/13M31)	75	5%	1/10W
R264	1-216-113-00	METAL GLAZE (KV-13M30/13M31)	470K	5%	1/10W
R284	1-216-041-00	METAL GLAZE	470	5%	1/10W
R285	1-216-041-00	METAL GLAZE	470	5%	1/10W
R290	1-247-807-31	METAL GLAZE (KV-13M30/13M31)	100	5%	1/4W
R291	1-216-295-91	CONDUCTOR, CHIP		(2012)	
R292	1-216-295-91	CONDUCTOR, CHIP (KV-13M20/14R20/14RD1/14PM1)		(2012)	
R297	1-216-295-91	CONDUCTOR, CHIP		(2012)	
R301	1-249-425-11	CARBON	4 7K	5%	1/4W
R302	1-216-057-00	METAL GLAZE	2 2K	5%	1/10W
R306	1-249-417-11	CARBON	1K	5%	1/4W
R307	1-216-295-91	CONDUCTOR,CHIP		(2012)	
R310	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R312	1-216-295-91	CONDUCTOR,CHIP		(2012)	
R335	1-247-815-91	CARBON	220	5%	1/4W
R336	1-247-815-91	CARBON	220	5%	1/4W
R339	1-216-057-00	METAL GLAZE	2 2K	5%	1/10W
R340	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R341	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R342	1-216-033-00	METAL GLAZE	220	5%	1/10W
R343	1-247-815-91	CARBON	220	5%	1/4W
R344	1-247-815-91	CARBON	220	5%	1/4W
R345	1-247-815-91	CARBON	220	5%	1/4W
R346	1-247-815-91	CARBON	220	5%	1/4W
R347	1-216-045-00	METAL GLAZE	680	5%	1/10W
R348	1-247-815-91	CARBON	220	5%	1/4W
R349	1-247-807-31	CARBON	100	5%	1/4W
R351	1-249-429-11	CARBON	10K	5%	1/4W
R353	1-249-417-11	CARBON	1K	5%	1/4W
R355	1-216-077-00	METAL GLAZE	15K	5%	1/10W
R356	1-249-421-11	CARBON	2 2K	5%	1/4W
R357	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R360	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R361	1-216-033-00	METAL GLAZE	220	5%	1/10W
R362	1-216-041-00	METAL GLAZE	470	5%	1/10W
R363	1-216-105-91	METAL GLAZE	220K	5%	1/10W
R365	1-247-419-11	CARBON	1.5K	5%	1/4W
R372	1-216-057-00	METAL GLAZE	2 2K	5%	1/10W
R430	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R432	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R439	1-216-065-00	METAL GLAZE	4 7K	5%	1/10W
R450	1-216-049-91	METAL GLAZE	1 0K	5%	1/10W
R460	1-216-061-00	METAL GLAZE	3 3K	5%	1/10W
R480	1-216-057-00	METAL GLAZE	2 2K	5%	1/10W
R490	1-249-417-11	CARBON	1K	5%	1/4W
R491	1-249-411-11	CARBON	330	5%	1/4W
R492	1-249-411-11	CARBON	330	5%	1/4W
R495	1-216-349-00	METAL OXIDE	1	5%	1W F
R501	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R505	1-216-349-00	METAL OXIDE	1	5%	1W F
R506	1-216-453-00	METAL OXIDE	270	5%	2W F
R507	1-247-891-00	CARBON	330K	5%	1/4W
R508	1-249-417-11	CARBON	1K	5%	1/4W
R509	1-216-101-00	METAL GLAZE	150K	5%	1/10W
R510	1-249-420-11	CARBON	1.8K	5%	1/4W
R511	1-249-429-11	CARBON	10K	5%	1/4W
R512	1-208-806-11	METAL GLAZE	10K	0 50%	1/10W
R513	1-208-773-11	METAL GLAZE	430	0 50%	1/10W
R515	1-208-806-11	METAL GLAZE	10K	0 50%	1/10W
R518	1-215-429-00	METAL	2 2K	1%	1/4W
R519	1-215-902-11	METAL OXIDE	47K	5%	2W F

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REF.NO.	PART NO.	DESCRIPTION			REMARK
R520	1-208-777-11	METAL GLAZE	620	0 50%	1/10W
R523	1-215-469-00	METAL	100K	1%	1/4W
⚠R526		METAL GLAZE			1/10W
R527	1-208-806-11	METAL GLAZE	10K	0 50%	1/10W
R531	1-216-359-00	METAL OXIDE	6 8	5%	1W F
R532	1-215-457-00	METAL	33K	1%	1/4W
R533	1-216-359-00	METAL OXIDE	6.8	5%	1W F
R534	1-215-462-00	FILM	51K	1%	1/4W
R536	1-215-437-00	METAL	4.7K	1%	1/4W
R538	1-215-863-11	METAL OXIDE	100	5%	1W F
R539	1-215-870-11	METAL OXIDE	1.5k	5%	1W F
R540	1-249-441-11	CARBON	100K	5%	1/4W
R542	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R543	1-208-842-11	METAL GLAZE	330K	0 50%	1/10W
R544	1-208-785-11	METAL GLAZE	1 3K	0.50%	1/10W
R545	1-249-441-11	CARBON	100K	5%	1/4W
R547	1-249-429-11	CARBON	10K	5%	1/4W
R548	1-216-113-00	METAL GLAZE	470K	5%	1/10W
R549	1-216-369-00	METAL OXIDE	1	5%	2W F
R550	1-216-295-91	CONDUCTOR, CHIP		(2012)	
R554	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R555	1-216-462-00	METAL OXIDE	8 2K	5%	2W F
R559	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R560	1-216-097-91	METAL GLAZE	100K	5%	1/10W
R563 ⚠	1-215-882-00	METAL OXIDE	22	5%	2W F
R568	1-215-865-11	METAL OXIDE	220	5%	1W F
R590	1-216-295-91	CONDUCTOR, CHIP		(2012)	
R601 ⚠	1-219-513-11	RES(SURGE RES)	4.7M	5%	1/2W
R602	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R603 ⚠	1-205-998-11	CEMENT	1	5%	10W
R605	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R606	1-260-288-11	RES, CARBON	0.47	5%	1/2W
R609	1-216-353-00	METAL OXIDE	2 2	5%	1W F
R610	1-216-353-00	METAL OXIDE	2.2	5%	1W F
R611	1-249-396-11	CARBON	18	5%	1/4W
R612	1-249-396-11	CARBON	18	5%	1/4W
R615	1-216-093-00	METAL GLAZE	68K	5%	1/10W
R616	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R617 ⚠	1-208-790-11	METAL GLAZE	2.2	0.50%	1/10W
R618 ⚠	1-215-463-00	METAL	100K	1%	1/4W
R619	1-216-001-00	METAL GLAZE	10	5%	1/10W
R625	1-216-377-11	METAL OXIDE	4.7	5%	2W F
R628	1-249-415-11	CARBON	680	5%	1/4W
R629	1-208-806-11	METAL GLAZE	10K	0.50%	1/10W
R630	1-208-826-11	METAL GLAZE	68K	0.50%	1/10W
R635	1-212-857-00	RES, FUSE	10	5%	1/4W
R641	1-247-889-00	CARBON	270K	5%	1/4W
R643	1-247-889-00	CARBON	270K	5%	1/4W
R645	1-247-893-11	CARBON	390K	5%	1/4W
R651	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R652 ⚠	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R653 ⚠	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R654 ⚠	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R655	1-216-085-00	METAL GLAZE	33K	5%	1/10W
R656	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R681	1-216-089-91	METAL GLAZE	47K	5%	1/10W
R682	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R683	1-215-924-00	METAL OXIDE	15K	5%	3W F
R684	1-249-429-11	CARBON	10K	5%	1/4W
R690	1-216-355-11	METAL OXIDE	3 3	5%	1W F
R704	1-216-369-00	METAL OXIDE	1	5%	2W F

<RELAY>

RY601 ⚠	1-755-186-11	RELAY	

<SWITCH>

S001	1-692-431-21	SWITCH, TACTILE	
S002	1-692-431-21	SWITCH, TACTILE	
S003	1-692-431-21	SWITCH, TACTILE	
S004	1-692-431-21	SWITCH, TACTILE	
S005	1-692-431-21	SWITCH, TACTILE	
S006	1-692-431-21	SWITCH, TACTILE	

<TRANSFORMER>

T504 ⚠	1-453-238-11	TRANSFORMER, FLYBACK	
T551	1-437-195-11	TRANSFORMER, HORIZONTAL DRIVE	
T602 ⚠	1-423-895-11	TRANSFORMER, LINE FILTER (LPT)	
T603 ⚠	1-429-483-21	TRANSFORMER, CONVERTER PT	
T604 ⚠	1-427-864-11	TRANSFORMER, CONVERTER (PRT)	

<THERMISTOR>

THP603 ⚠	1-810-597-11	THERMISTER, POSITIVE	

<TUNER>

TU101 ⚠	8-598-339-00	TUNER BSF-LA402	

<VARISTOR>

VDR601	1-801-074-41	VARISTOR ERZV10D271	

<CRYSTAL>

X300	1-577-611-11	OSCILLATOR, CERAMIC	
X303	1-760-190-41	VIBRATOR, CRYSTAL	

* A-1331-519-A MOUNTED PCB, C
****

<CAPACITOR>

C701	1-136-601-11	FILM	0.01MF	10%	630V
C706	1-126-965-11	ELECT	22MF	20%	50V
C712	1-163-135-00	CERAMIC CHIP	560pF	5%	50V
C732	1-163-005-11	CERAMIC CHIP	470pF	10%	50V
C752	1-163-005-11	CERAMIC CHIP	470pF	10%	50V
C771	1-102-110-00	CERAMIC	220pF	10%	50V
C772	1-102-110-00	CERAMIC	220pF	10%	50V
C773	1-102-110-00	CERAMIC	220pF	10%	50V

The components identified by shading and mark ⚠ are critical for safety
Replace only with part number specified

C

REF.NO.	PART NO.	DESCRIPTION				REMARK
	<CONNECTOR>					
CN701	1-695-915-11	TAB (CONTACT)				
	<DIODE>					
D770	8-719-991-33	DIODE 1SS133T-77				
D771	8-719-991-33	DIODE 1SS133T-77				
D772	8-719-991-33	DIODE 1SS133T-77				
D773	8-719-991-33	DIODE 1SS133T-77				
D777	8-719-109-72	DIODE RD3 9ESB2				
	<JACK>					
J701 ⚠	1-251-193-11	SOCKET, CRT				
	<COIL>					
L702	1-408-419-00	INDUCTOR	68UH			
	<TRANSISTOR>					
Q711	8-729-326-11	TRANSISTOR 2SC2611				
Q731	8-729-326-11	TRANSISTOR 2SC2611				
Q751	8-729-326-11	TRANSISTOR 2SC2611				
Q770	8-729-119-76	TRANSISTOR 2SA1175-HFE				
Q771	8-729-200-17	TRANSISTOR 2SA1091-O				
Q772	8-729-200-17	TRANSISTOR 2SA1091-O				
Q773	8-729-200-17	TRANSISTOR 2SA1091-O				
	<RESISTOR>					
R700	1-260-087-11	CARBON	100	5%	1/2W	
R702	1-260-131-11	CARBON	470K	5%	1/2W	
R703	1-260-123-11	CARBON	100K	5%	1/2W	
R707	1-260-131-11	CARBON	470K	5%	1/2W	
R708	1-260-135-11	CARBON	1M	5%	1/2W	
R710	1-260-099-11	CARBON	1K	5%	1/2W	
R712	1-215-924-00	METAL OXIDE	15K	5%	3W	F
R716	1-249-412-11	CARBON	390	5%	1/4W	
R717	1-216-295-91	CONDUCTOR, CHIP		(2012)		
R730	1-260-099-11	CARBON	1K	5%	1/2W	
R732	1-215-924-00	METAL OXIDE	15K	5%	3W	F
R736	1-249-412-11	CARBON	390	5%	1/4W	
R737	1-216-295-91	CONDUCTOR, CHIP		(2012)		
R750	1-260-099-11	CARBON	1K	5%	1/2W	
R752	1-215-924-00	METAL OXIDE	15K	5%	3W	F
R756	1-249-412-11	CARBON	390	5%	1/4W	
R757	1-216-295-91	CONDUCTOR, CHIP		(2012)		
R770	1-216-089-91	METAL GLAZE	47K	5%	1/10W	
R771	1-216-049-91	METAL GLAZE	1K	5%	1/10W	
R772	1-216-049-91	METAL GLAZE	1K	5%	1/10W	
R773	1-216-049-91	METAL GLAZE	1K	5%	1/10W	
R774	1-216-089-91	METAL GLAZE	47K	5%	1/10W	
R775	1-216-049-91	METAL GLAZE	1K	5%	1/10W	
R776	1-216-033-00	METAL GLAZE	220	5%	1/10W	

REF.NO.	PART NO.	DESCRIPTION	REMARK
	<VARIABLE RESISTOR>		
RV702	1-230-641-11	RES, ADJ, METAL GLAZE 2 2M	
RV703	1-230-641-11	RES, ADJ, METAL GLAZE 2 2M	
	MISCELLANEOUS		
	**********		
	X-4309-815-0	PERMALLOY ASSY, CONVERGENCE	
⚠	1-429-146-21	COIL, DEMAGNETIZATION	
	1-452-032-00	MAGNET,DISC	
	1-452-277-00	MAGNET, BMC	
	1-505-265-11	SPEAKER (9X5CM)	
⚠	1-751-037-11	CORD, POWER (WITH CONNECTOR) 10A/125V (KV-13M30/13M20/14R20/14RD1/14PM1)	
⚠	1-751-658-11	CORD, POWER (WITH CONNECTOR) 10A/125V (KV-13M31)	
	1-766-374-11	PLUG, F-PIN	
	3-704-372-31	HOLDER, HV CABLE	
	4-046-162-01	EMBLEM (NO 6), SONY	
	4-051-567-01	BUTTON, MULTI (KV-13M30/13M20/14R20/14RD1/14PM1)	
	4-051-567-11	BUTTON, MULTI (KV-13M31)	
	4-051-568-01	FILTER, REMOTE	
	4-051-569-01	DOOR, CONTROL (KV-13M30/13M20/14R20/14RD1/14PM1)	
	4-051-569-11	DOOR, CONTROL (KV-13M31)	
⚠	8-451-413-11	CRT Y14NDA2 (VTM)	
⚠	8-735-562-05	CRT 14NDXM	
	ACCESSORIES AND PACKING MATERIALS		
	**********		
	1-417-182-11	CONVERTER (EAC-25)	
	1-501-730-11	ANTENNA, TELESCOPIC (KV-14R20/14RD1/14PM1)	
	1-501-730-41	ANTENNA, TELESCOPIC (KV-13M20/13M30/13M31)	
*	3-701-627-00	BAG, POLYETHYLENE	
	3-810-814-21	MANUAL, INSTRUCTION (KV-13M20/13M30/13M31)	
	3-810-814-41	MANUAL, INSTRUCTION (KV-14R20/14RD1/14PM1)	
*	4-041-253-01	BAG, PROTECTION	
*	4-052-620-01	CUSHION (LOWER) (ASSY)	
*	4-052-621-01	CUSHION (UPPER) (ASSY)	
*	4-052-622-01	CARTON, INDIVIDUAL (KV-13M20/13M30/13M31)	
*	4-052-630-01	CARTON, INDIVIDUAL (KV-14R20/14RD1/14PM1)	
	REMOTE COMMANDER		
	**********		
	1-466-966-31	REMOTE COMMANDER (RM-Y116) BLACK (KV-13M20/13M30/14R20/14RD1/14PM1)	
	1-466-966-41	REMOTE COMMANDER (RM-Y116) WHITE (KV-13M31)	
	9-903-826-11	COVER, BATTERY (FOR RM-Y116) BLACK (KV-13M20/13M30/14R20/14RD1/14PM1)	
	9-903-826-21	COVER, BATTERY (FOR RM-Y116) WHITE (KV-13M31)	

9-965-812-01

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